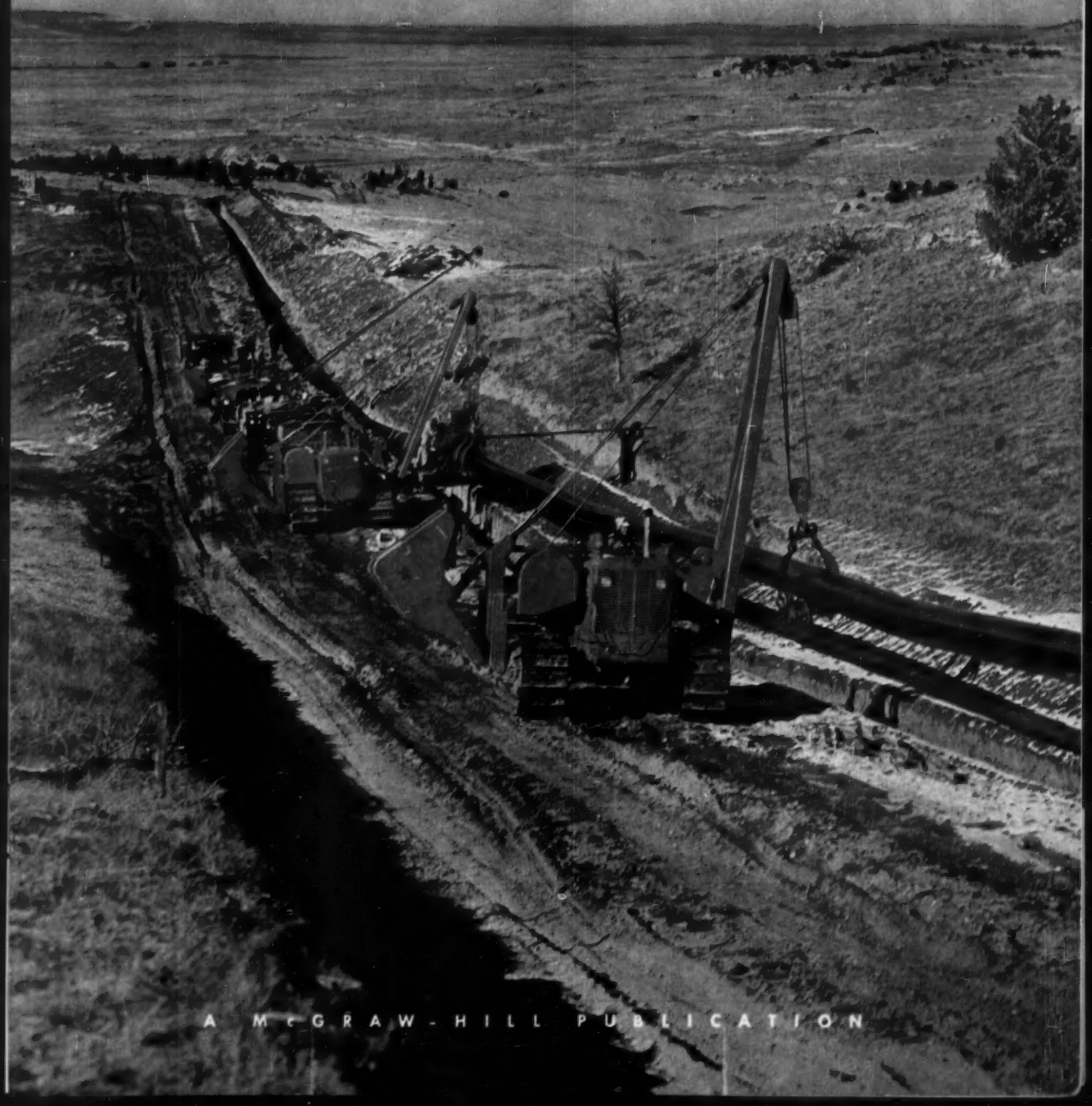
50 CENTS

# CONSTRUCTION METHODS AND EQUIPMENT

December 1955



A McGRAW-HILL PUBLICATION

This Torcon-equipped dragline gets more work by the bucket with less work by the engine.

# Self-contained oil circuit keeps TORCON efficiency high

This simple design feature is a big factor in keeping TORCON efficiency consistently high: the oil sump is an integral part of the housing—no complicated oil seals to lessen efficiency and complicate maintenance. Oil passages are cored in the housing—no extra hoses and fittings.

Easy accessibility is valuable, too. Simply remove two cover-plates, and the whole unit is fully exposed for inspection and service—no special tools needed.

The Clark-Torcon is a complete unit, mass-produced, available off-the-shelf to engine and original equipment manufacturers, and to owners and operators. It's the broadest line available to industry, with a wide range of wheel diameters and a complete choice of options, for easy fitting into any torque-transmission system.

*There's a Torcon to FIT YOUR NEED*

This fully illustrated, easy-to-read bulletin explains torque multiplication clearly; and indicates its many industrial applications. Use the coupon to get your copy.

## A Complete Quality Line—Clark-Torcon

**All Sizes**—from 15 to 600 H.P.

**Broad Range of Options**—readily adaptable to many applications

**No Cavitation**—proper oil flow prevents turbulence and formation of air pockets to cause wear and loss of efficiency

**High Efficiency over wide range**—more work done, and reduced wear on components

**Individually Cast One-Piece Elements**—no welds or fabrications to distort under extreme loads

SCHNEIDER SYSTEM

CLARK EQUIPMENT

**CLARK EQUIPMENT COMPANY,** Jackson 1, Michigan: Please send the CLARK-TORCON Bulletin

Name_____ Position_____

Firm_____ Address_____

City_____ Zone_____ State_____

# B.F.Goodrich

## Switches to All-Nylon All-Purpose tires, reports "we really get our money's worth"

Two years ago Jernigan Trucking Company trucks were hauling stone to bridge approaches in the Clark Hill Dam area, northwest of Martinez, Georgia. Giant loads had to be carried over rough, back-country roads. The company found that even brand new tires were ruined in a month or less by concussion blowouts and cord failures. Schedule delays cost the company even more money.

Then Jernigan switched to new B. F. Goodrich All-Purpose tires with *all-nylon* construction. The result: no more blowouts; the tires have traveled over 50,000 miles, will be good for another 25,000 before recapping. No wonder Office Manager H. B. Leonard says, "We find the best tire is the cheapest in the long run, and we get every dollar's worth out of B. F. Goodrich All-Purpose tires."

The All-Purpose tread is up to 67% deeper than that of a regular tire. Husky curved cleats with "buttons" resist dangerous skids, give maximum traction off the road, longer wear on the road. And under the tread is the nylon cord body. Nylon resists double the impact of regular cord materials, withstands heat blowouts and flex breaks. *All-nylon* All-Purpose tires outwear the extra-thick tread, can still be recapped over and over.

See your B. F. Goodrich retailer today and save money on tires. Or write *The B. F. Goodrich Company, Tire & Equipment Division, Akron 18, Ohio.*

**JERNIGAN'S** 17 trucks carry loads up to 20 tons to construction sites around Martinez, Ga., work on and off the road.

**NORTHWEST CONSTRUCTION CO.,** Seattle, Wash., reports B. F. Goodrich Rock Logger tires give 60,000 miles plus 2 recaps!

**Specify B. F. Goodrich tires when ordering new trucks or trailers**

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

*Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book*

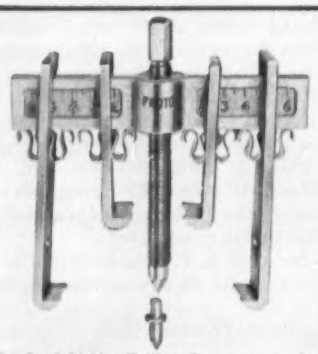
# Get More "Pull" for Your Money

## with PROTO's Interchangeable Pullers...

Slide-hammer Puller

Standardize on PROTO Pullers, and you can handle a maximum variety of jobs with a minimum of interchangeable parts. You can change PROTO Pullers quickly from two to three jaws, convert from light to medium-duty types, add slide hammers and special jaws, do inside or outside pulling. See your PROTO dealer! Send 10¢ for catalog of entire line to

PLOMB TOOL COMPANY
2245J Santa Fe Ave.,
Los Angeles 54, Calif.



**For Straight Line Pulling.** Crossarms marked for positioning jaws. Clip springs hold jaws in place. Detachable "live-center" tips.

Eastern Factory, Jamestown, N.Y. • Canadian Factory, London, Ont.



CONSTRUCTION METHODS AND EQUIPMENT

Volume 37 Number 12

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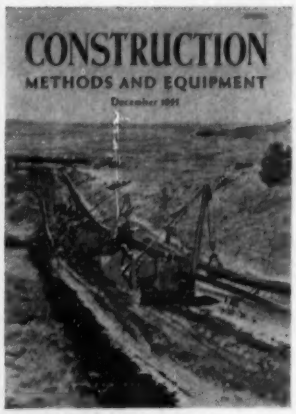


## On the Cover

H. B. Zachry Co. of San Antonio, Tex., laid 10 mi of 20 to 24-in. pipe a day on Service Pipe Line Company's 625-mi line from Ft. Laramie, Wyo., to Freeman, Mo. Zachry operated four spreads on the western end of the line. Photo shows Allis-Chalmers side boom tractors laying pipe near Albin, Wyo.

**CONCRETE WORK**

Any contractor who does concrete work will find CM&E's series of articles on Concrete Mixing and Placing useful. Reprints are available in booklet form. Single copies are 50¢; for orders of 10 copies or more, the price is 40¢ each. Address your order to the Editor.


Member ABP

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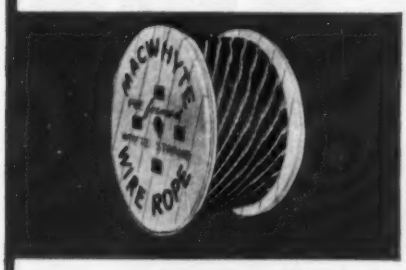


# Prompt Service

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Your wire rope needs, whether they be for Round-Braided Slings, Cable Assemblies, or Wire Rope, are given prompt service by Macwhyte Company distributors.

Macwhyte manufactures a wide variety of sizes and types to provide materials best suited to your needs.

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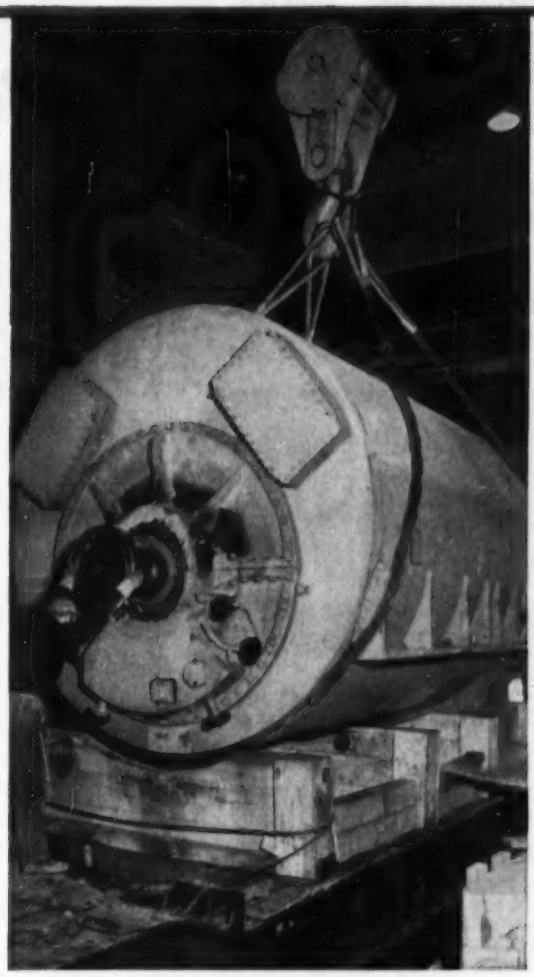
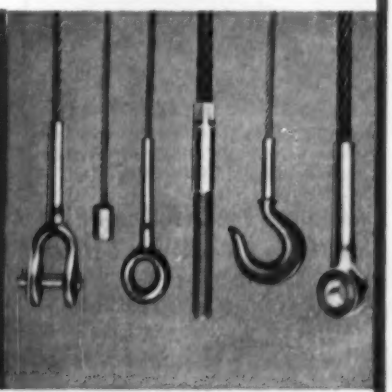


**ROUND-BRAIDED SLINGS:** Two Macwhyte ATLAS Round-Braided Slings handling 125-ton generator unit. These are Type No. 1 Slings made of alternate left and right lay wire rope, braided for light weight, maximum flexibility, and safety.

**SLINGS:** Macwhyte makes a wide range of sizes and types of Braided and Single-Part wire rope slings. Custom designs are made to meet special needs. For information, ask for Catalog S-8.

**WIRE ROPE:** There is a right rope for each equipment need. Catalog G-16 lists all classifications and sizes, also included is general information on handling and use of wire rope.



**ASSEMBLIES:** Macwhyte "Safe-Lock" Wire Rope Assemblies are made in a wide range of sizes, with fittings permanently attached to one or both ends. Many standard types are listed in Catalog No. 5201.

BIG HEAD START
ON DEADLINE WITH
FOSTER
RENTAL
STEEL—SHEET
PILING

*Checking Foundations with 120-Ton Load on H-Bearing Frames Anchored to Foster Piling*
Hotel - Department Store - Parking Facility
THE DENVER COLORADO PROJECT

Contractors Webb & Knapp got a *Head Start* on this gigantic project by calling Foster for rental steel-sheet Piling, to complete four sumps (that were holding up the major excavation of this 400-foot square foundation). Foster delivered *on time*, the exact sections and exact lengths of steel-sheet Piling needed to get a head start on work schedules.

Foster 12"x 53 lb. H-Bearing Piles driven an average depth of 50 feet, around perimeter of the gigantic 400 foot excavation.

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*Call L. B. FOSTER for Service*
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• LIGHTWEIGHT PILING
• PIPE PILES
FASTER from FOSTER
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## Pay Dirt in This Issue

*December, 1955*

**Hard Rock Tunnel Job: A Smooth Operation** . . . . 52
Working around the clock, drillers advance more than 85 ft a day through hard granite on New Haven water tunnel job.

**Scrapers Pass Tough Loading, Hauling Tests** . . . . 56
Contractor uses scrapers alone to move 1,702,000 cu yd of excavation, much of it compacted shale, on U. S. 101.

**Rigid Scaffolding Speeds Demolition** . . . . . 60
Use of stationary sectional scaffolding instead of hanging scaffolds proves economical on New York demolition job.

**Concrete Houses Go Up in a Hurry** . . . . . 62
Six units are completed daily on Puerto Rican job, with aid of 35-ton steel form for casting walls monolithically.

**Canal Job Goes Ahead of Schedule** . . . . . 76
Slip-form canal-lining machine does double duty for Morrison-Knudsen on construction of Gateway Canal in Utah.

**Conveyors Place Concrete Slab** . . . . . 84
Two 40-ft conveyors working with chutes help contractor place 1,100 cu yd of concrete in 13 hr on Buffalo job.

**How to Protect Your Job and Your Property** . . . . . 91
Specs usually make you responsible for "all physical loss and damage" on your jobs. Is your insurance adequate?

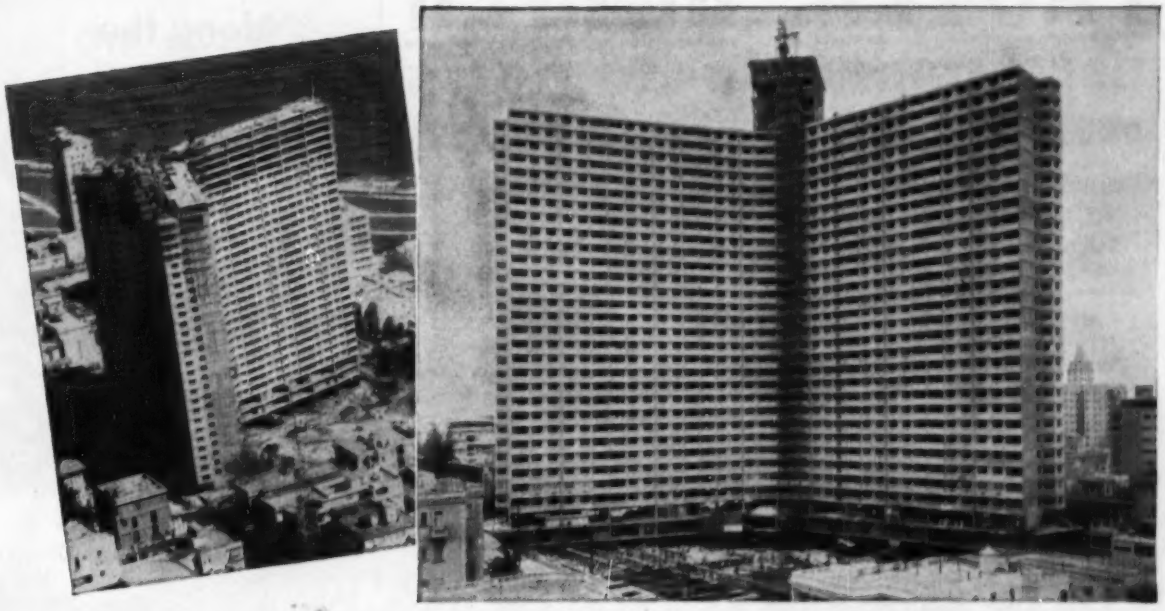
**Paving . . . How to Get the Best Results** . . . . . 121
The fourth in CM&E's series of articles on paving gives pointers on construction of plant-mix bituminous pavement.

Job Talk ..... 6
It's Your Business ..... 28
Picture of the Month ..... 39
Construction News in Pictures ..... 41
Construction 'Round the World ..... 46
Editorial ..... 51
Cut Costs of Pre-Tensioning ..... 55
Film Teaches Safety ..... 59
Photos Save Time, Trouble ..... 105
McGraw-Hill Editorial ..... 109
Year-Round Maintenance ..... 117
Contractor-Labor Relations ..... 137
Sales and Service ..... 144
Construction Equipment News ..... 152
Methods Memo ..... 186

**NEXT MONTH**

Contractors working on construction of the Massachusetts Turnpike were hit hard by recent heavy rains and floods, but now they are moving ahead full speed. A CM&E editor brings you a full description of the work they are doing.

# HIGH AND MIGHTY



## Havana Builds World's Tallest Concrete Apartment Building

"17 y M" COOPERATIVE APARTMENT BUILDING
Vedado, Havana, Cuba

Owner:
FOMENTO DE OBRAS Y CONSTRUCCIONES, S.A. (FOCSA)

Architects:
ERNESTO GÓMEZ SAMPERA, MARTÍN DOMÍNGUEZ, BARTOLOMÉ BESTARD, MANUEL PADRÓN

Structural Engineers:
LUIS SAENZ, E. R. CANCIO, IGNACIO MARTÍN

Contractor: PROYECTOS OBRAS Y CONSTRUCCIONES, S.A.

● Nearing completion in Havana's Vedado section is one of the world's outstanding buildings—the tallest concrete apartment house, rising 39 stories, a total of 402 ft. above its footings.

Floors of this high and mighty structure are two-way reinforced concrete slabs. Walls instead of columns support the building's full weight, serve as partitions between apartments and as wind bracing, in a fire-safe, rigid, monolithic structure built to resist winds of hurricane force. The cellular structure provided the architects with ideal clear floor areas.

Framing in concrete saved almost a million pesos, as compared with alternative methods, again emphasizing the economies inherent in reinforced concrete.

With 30 floors of apartments selling at an average price of $20,000 per apartment, and income from rental space on the other floors, the owners will recoup their investment of 6-million pesos (1 peso equals 1 dollar) when 80% of the apartments are sold.

Cuba's designers have a way with concrete, as is well exemplified by this dramatic structure, in which, when completed, a total of over 110,000 bbls. of cement produced by Lone Star's Cuban subsidiary, La Compañia Cubana de Cemento Portland, will have been used.

LONE STAR CEMENTS COVER THE ENTIRE CONSTRUCTION FIELD

## LONE STAR CEMENT CORPORATION

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LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 18 MODERN MILLS, 141,600,000 SACKS ANNUAL CAPACITY

# TO ERECT STEEL FASTER, BETTER

## USE HIGH-STRENGTH BOLTS AND MIL-CARB® CARBURIZED WASHERS

BOLT . . . instead of *rivet*. Authorities on Structural Steel Framing Practice say it's stronger, faster, and costs less to BOLT!

BOLT, and save time, erecting buildings or bridges. With modern MIL-CARB carburized washers on high tensile steel bolts you can torque up greater clamping force than is produced by the cooling of rivets. Bolts of same diameter as rivets can be used . . . bolts that have greater strength than comparable rivets . . . bolts that do not demand "scarce" field riveters in structural practice . . . bolts that *produce high strength joints* with 25% greater fatigue resistance than comparable rivet-joints . . . bolts that permit QUIET construction, free from the jarring rat-a-tat-tat of riveting . . . bolts that lower the cost of structural steel jointing that is better in every way!

BOLT your way to bigger profits. Remember, of course, that *no* bolt is any better than its washers . . . and remember, too, that only Prime Carburizing-Quality Special-Soundness Steel is used in MIL-CARB Washers, insuring uniform quality control always equal to the rigid specifications (ASTM Designation A325), applying to nuts, bolts and washers.

***MAY WE HELP YOU?***

If you have a specific question or a problem pertaining to washers, we shall be glad to give you the benefit of our experience.

*Remember:* "NO BOLT IS ANY BETTER THAN ITS WASHERS"

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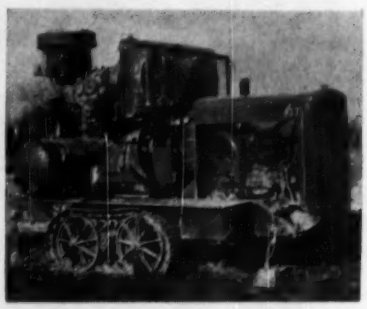
# *Job Talk...*

## . . . Along the Massachusetts Turnpike



### Compressor on Tracks

By mounting a Joy 600-cfm compressor on an Athey track frame, B. Perini & Sons, Inc. has solved the problem of carrying compressed air over rough terrain. Pulled by a tractor, it can reach many areas not accessible by rubber-tired units. It is powered by a Cummins diesel.

### Pipes Dwarf Crane

TWO HUGE ARMCO corrugated-metal pipes 126 in. in dia overshadow crane on rugged section of Turnpike. Pipes are being assembled for third time in two months. Floods damaged them twice before

*(Continued on page 10)*

# NORTHWESTS LEAD THE WAY on another TURNPIKE!

## Already 16 NORTHWESTS HAVE STARTED THE TOUGH WORK ON THE KANSAS TURNPIKE!

In the tough rock cuts on the Kansas Turnpike—that's where you find those big Northwest 80-D's—16 of them—doing the real hard work on the Kansas Turnpike right-of-way!

And this is only part of the list of many Northwests (more than any other make) on the whole Kansas Turnpike job.

Here again, Northwest owners lead the way with a *real* Rock Shovel, the kind of equipment you should have, for remember, if you have a *real* Rock Shovel you never have to worry about output in any digging.

See a Northwest Man.

**NORTHWEST ENGINEERING COMPANY**
1503 Field Building, 135 South LaSalle Street, Chicago 3, Illinois

HISTORY REPEATS ITSELF

- OVER HALF THE SHOVEL EQUIPMENT ON THE WEST VIRGINIA TURNPIKE WAS NORTHWEST
- WELL OVER 100 NORTHWESTS ON THE NEW YORK THRUWAY—MORE THAN ANY OTHER MAKE
- OVER 60 NORTHWESTS ON THE OHIO TURNPIKE
- OVER 20 NORTHWESTS ON THE MAINE TURNPIKE EXTENSION
- 42 NORTHWESTS ON THE MASSACHUSETTS TURNPIKE—MORE THAN ANY OTHER MAKE

# NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

# 3 NEW BIG GALION GRADE-O-MATIC MOTOR GRADERS

**Models**

**T-700**
190 H.P.
**40,125 lbs.**

**T-600**
140 H.P.
**29,800 lbs.**

**T-500**
125 H.P.
**25,000 lbs.**
with scarifiers

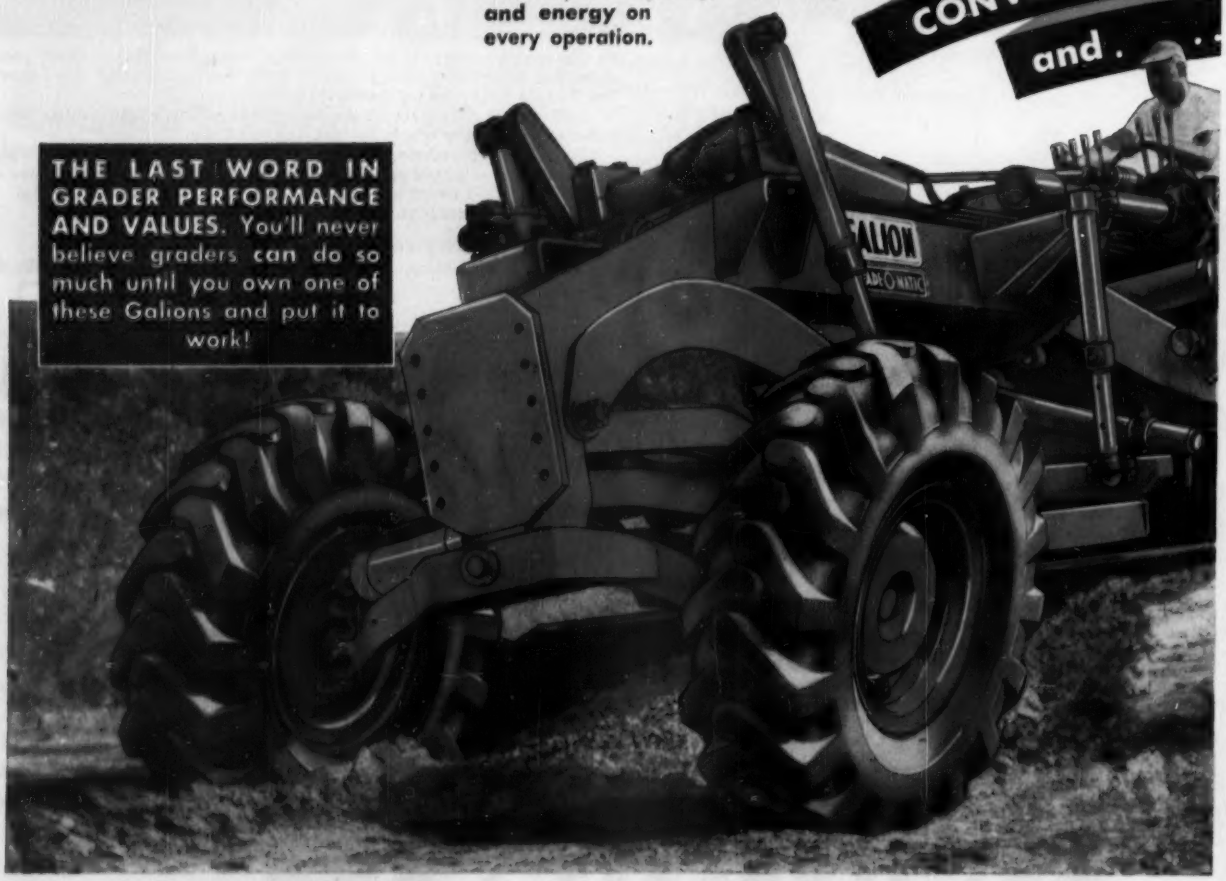
**WEIGHT FOR WEIGHT they have more "PUSH-POWER" at the blade than any other motor graders built. They are also the most productive and easiest to operate, because they have what you've always wanted — POWER BALANCED TO MATCH WEIGHT. They utilize their power without useless, costly spinning of the drive wheels. Every part is designed for size, weight, strength, and type of metal to function in proportion to their tremendous "PUSH-POWER" at the blade.**

**These three GALION GRADERS also have what you now need — GALION GRADE-O-MATIC DRIVES (torque converters and power-shift transmissions). EASY TO SHIFT, much like the best automobiles, the shifting work is done for you. All you do is move the fingertip control levers. You can shift "on the go" in either direction. With the T-700 you have 3 speeds forward, 3 speeds reverse — with the T-600 and T-500 you have 4 speeds each direction — from creeper to high travel speed.**

**The old type heavy duty FOOT CLUTCH IS GONE, together with its tiresome clutching and declutching. You get FAST WORK CYCLES because you can reverse smoothly and quickly, save time and energy on every operation.**

**WITH TORQUE CONVERTERS and . . .**

**THE LAST WORD IN GRADER PERFORMANCE AND VALUES.** You'll never believe graders can do so much until you own one of these Galions and put it to work!



# It's the "PUSH-POWER" at the Blade that counts!

- With these **TORQUE CONVERTER** and **POWER-SHIFT TRANSMISSION** combinations, the power is transmitted automatically in an infinite number of ratios. You get, in addition to effortless, automatic shifting, quick increases of torque multiplications to over 300% — automatically as needed. The torque converters also absorb the load shocks and prevent engine lugging or stalling.
- With this kind of smooth, shockless power transmission, effortless shifting, and balance of weight to horsepower, you get more work done easily than you ever thought possible.
- **HEAVY DUTY DIESEL ENGINES** are designed and matched to perform with torque converters and power-shift transmissions for maximum economy and efficiency for each size grader.
- **FOOT DECELERATORS** — for quickly reducing engine speeds and for increased ease of operation, permit immediate return to travel speed without changing the hand throttle.
- **TAIL SHAFT GOVERNORS** on the torque converters adjust the engine speed automatically to meet all loads or conditions — at any predetermined working or travel speed.

**"PUSH-POWER" AT THE BLADE is the only power that counts in rating the efficiency and work production value of a motor grader.**

**ENGINEERED TO GIVE CORRECT BALANCE OF WEIGHT AND POWER.** Graders with too much engine power and not enough grader weight spin their drive wheels, dig in, or side slip. High engine power, if not completely utilized, results in constant fuel waste and excessive tire wear.

## .. POWER-SHIFT TRANSMISSIONS

Diesel engine, torque converter, power-shift transmission, and muffler are **STANDARD EQUIPMENT** on each model. Shiftable moldboard and 4-wheel brakes are standard equipment on Models T-600 and T-700.

**GRADE-O-MATIC MOTOR GRADERS retain all the famous GALION features which also make for easy operation and increased production.**

- Hydraulic booster steering.
- Extra-large positive traction tires — same size front and rear.
- Extra heavy and rugged front axle assembly.
- Extra sturdy box-type, single member frame; high-arched for maximum blade adjustments.
- Full visibility of work.
- Complete and effortless blade adjustments.
- Full hydraulic operation with fingertip controls.
- Comfortable platform and seat — with stand-up height weatherproof cabs available.

ESTABLISHED GALION 1907

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THE GALION IRON WORKS & MFG. CO., Gen. and Exp. Offices, GALION, OHIO, U.S.A.
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# POWER by HERCULES

choice of gasoline or diesel

Here's another example of powerful equipment offering the choice of either Hercules Gasoline or Diesel Power. The Oliver OC-12 Crawler Tractor is available with either the dependable Hercules Gasoline Engine, Model JXLD or the rugged fuel-saving Hercules Diesel Engine, Model DJXC.

The inherent fuel economy of the diesel powered OC-12 pays greatest dividends when the equipment is operated at full schedule. The JXLD powered OC-12 provides the same type of rugged dependable service and is often specified when the equipment is to be operated at less than full schedule.

The modern line of Hercules Gasoline and Diesel Engines provide the right type of engine from 3 to 500 H.P. for your power requirements. For dependable service, specify Hercules Power — the product of Engine Manufacturing Specialists Since 1915.

**HERCULES ENGINES**

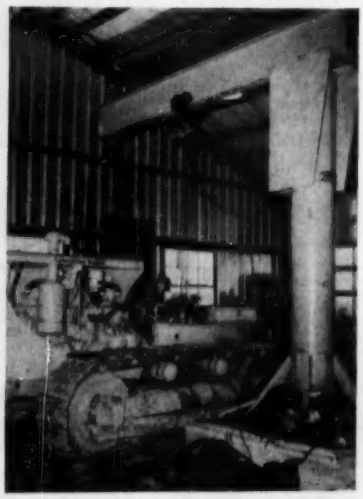
HERCULES MOTORS CORPORATION

*40 Years of Engines for Industry*

111 Eleventh Street, S. E. • Canton, Ohio


**JOB TALK . . . Continued from page 6**

they were completed. There was no fill on them the first time, and they were dragged ¼ mi downstream. The second time, raging waters bent up the exposed ends on the upstream side of a partially completed fill. With the pipes blocked, the river backed up and prepared to wash away the fill. The contractor quickly blasted the ends of the pipes and the water poured through. They are now safe and sound under 175 ft of rock and earth.



## Handy Shop Crane

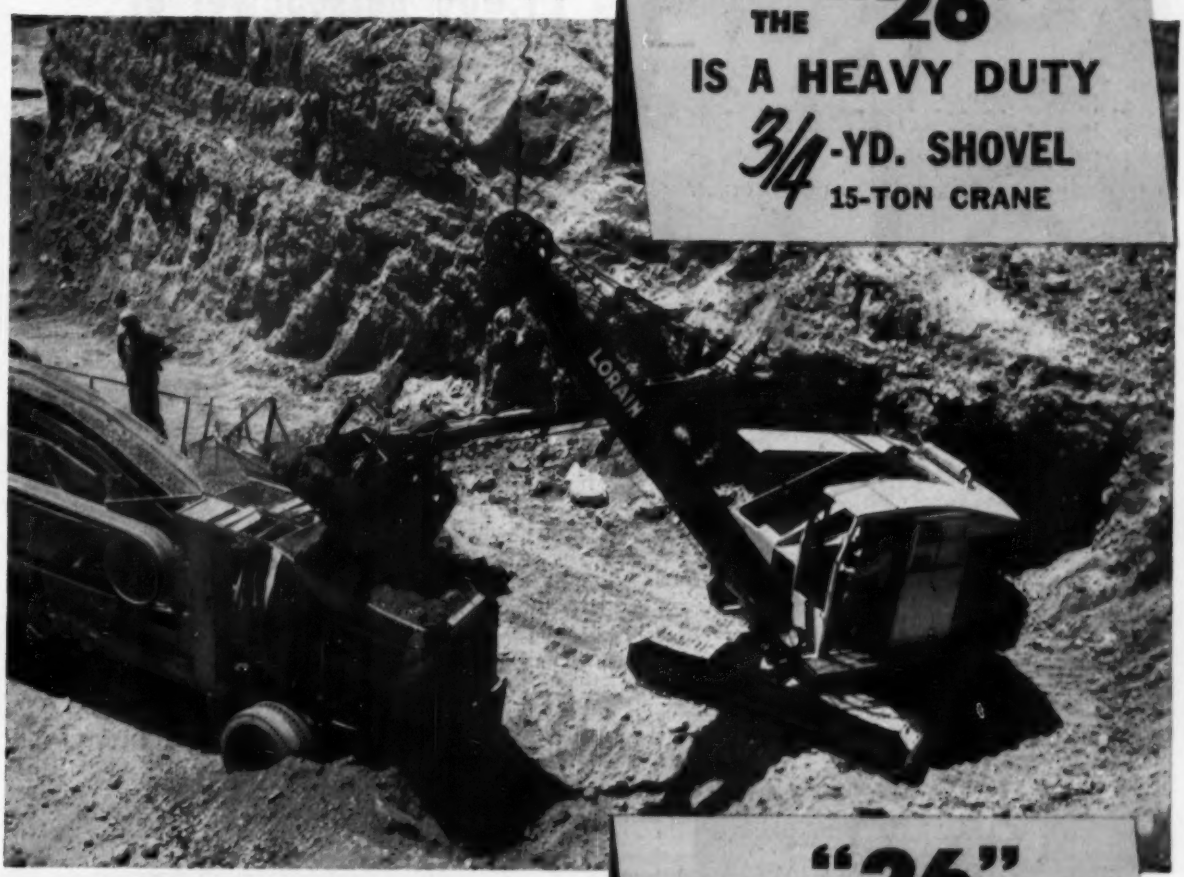
Heavy transmission is removed from Cat tractor by Comet 3-ton hoist riding on boom of Cleveland-Beacon crane. S. J. Groves & Sons Co. keeps rig busy in maintenance shop on Turnpike. Boom rotates 360 deg to cover two bays. Rig is housed in 50x100 Butler shop.

## Radiator Guard

Even rugged dump trucks have parts vulnerable to damage, so Perini welds steel frame in front of radiator to protect it from

*(Continued on page 22)*

# LORAIN SAYS . . .




## THE "26" IS A HEAVY DUTY 3/4-YD. SHOVEL 15-TON CRANE

## THE "26" "CONSTANTLY STANDS TERRIFIC DIGGING STRAIN"

The best test for any shovel is on the job. That's where product claims must be proved . . . and that's why Partner and Manager C. R. Davis of the Albany Gravel Co., Albany, Mo., says far more in these words than any claims Lorain may make . . . *"Our Lorain-26 is used for digging natural gravel from a solid deposit. It stands terrific digging strain constantly and takes hard digging abuse exceptionally well."* This is just one owner's reaction to the new Lorain-26. See your Thew-Lorain Distributor. He can show you Lorain-26's at work.

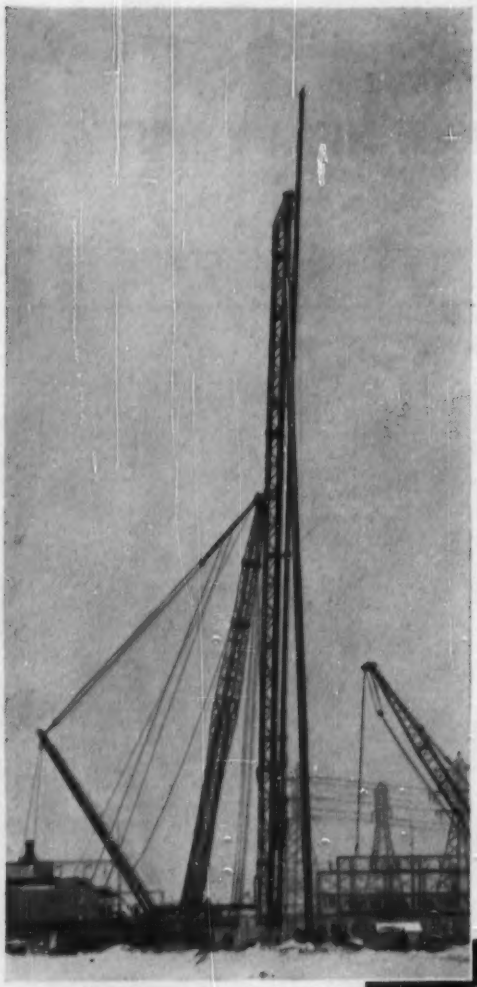
## THIS LORAIN OWNER SAYS...

**AND HERE'S WHY**—this combination of features found in no other machine!

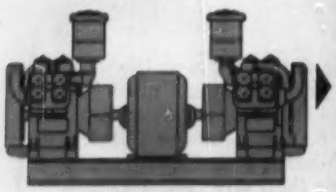
- *New Lorain "E-Z" Controls • "Big Look"—larger, wider cab for greater operator comfort • "Hydra-Ease" power control of crawler steering, tread lock, house lock and shifting of swing-travel jaw clutches.*
- *Hydraulic Coupling power take-off for no-stall, no-shock, "never-say-die" smooth application of power • No digging shocks transferred to mechanism.*
- *5 identical, Interchangeable Shoe Clutches • Bigger clutches with 18% more capacity, plus new, easier action, longer-life design • 19 anti-friction bearings on power shafts and clutch drums.*
- *19 ft. shovel boom for maximum reaches—powerful, independent cable crowd • Much greater weight—over 47,000 lbs. as a shovel • 15-ton crane capacity with 2-piece pin-connected boom • Power load lowering standard • Ability to back-down the load • Third Drum available.*
- *Newly-designed, sturdier, wider, 2-speed Crawlers with 29-inch wide drop-forged treads • 2 crawler speeds in both directions • Oil-enclosed crawler travel mechanism • 4-way, positive Tread & Travel Lock—fully enclosed.*
- *Truss-type Turntable Bed • Hook Rollers—front 2 are on anti-friction bearings.*

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®



This pile driving and jetting rig, designed by Raymond engineers, is one of the tallest in existence, with a 112 ft boom and 220 ft jetting pipe which had to be equipped with an aircraft warning light.



Ten Ingersoll-Rand Type 40 two-stage compressors supplied 100 psi air for the jetting work on this 200-ft pile driving job. They are mounted back-to-back in pairs, with a 200-hp driving motor direct connected to each pair of compressors. These I-R units operated a total of 18,000 machine hours without a single breakdown.

Ingersoll-Rand air-cooled compressors are available in units of ¼ to 250 horsepower.

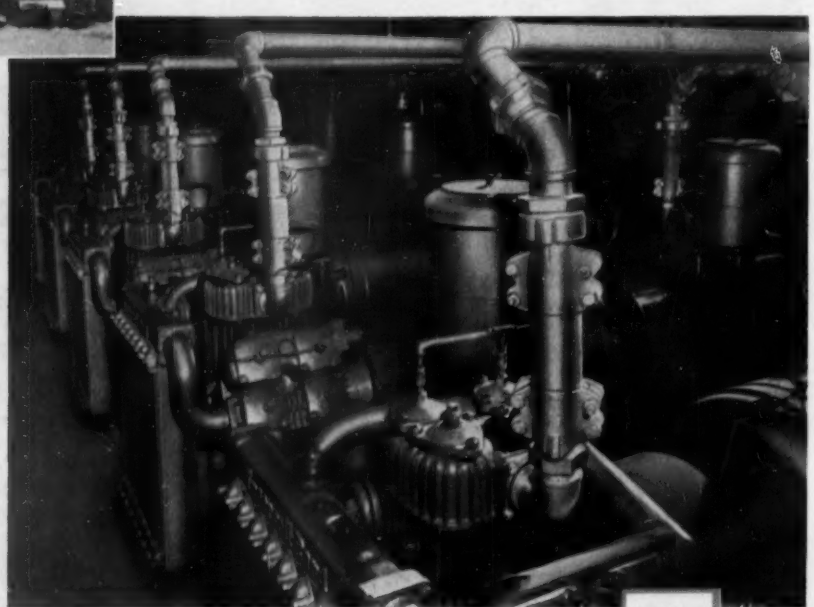
# 1,000 horsepower of Air-Cooled Compressors help drive

# 200 FT. PILES

To get down to bed rock on a large power plant construction job, the Raymond Concrete Pile Company had to sink 24" steel pipes 180-ft long to a total depth of 200 ft. In order to start and drive these king-size piles, air and water jetting was first used to sink a 30" casing 50 ft down through the relatively soft overburden. The 180-ft pile pipes were then inserted in the casing, driven down to solid rock, cleaned out by jetting and filled with concrete.

The large volumes of air needed for the jetting work were provided, at 100 psi, by ten Ingersoll-Rand Type 40 compressors, mounted back-to-back in pairs, each pair driven by a 200-hp motor as shown below. These compact, air-cooled two-stage compressors proved well suited to this type of construction work. They are easy to move and install, give wide flexibility of air capacity, require no water connections and can be used in the coldest weather without danger of freezing.

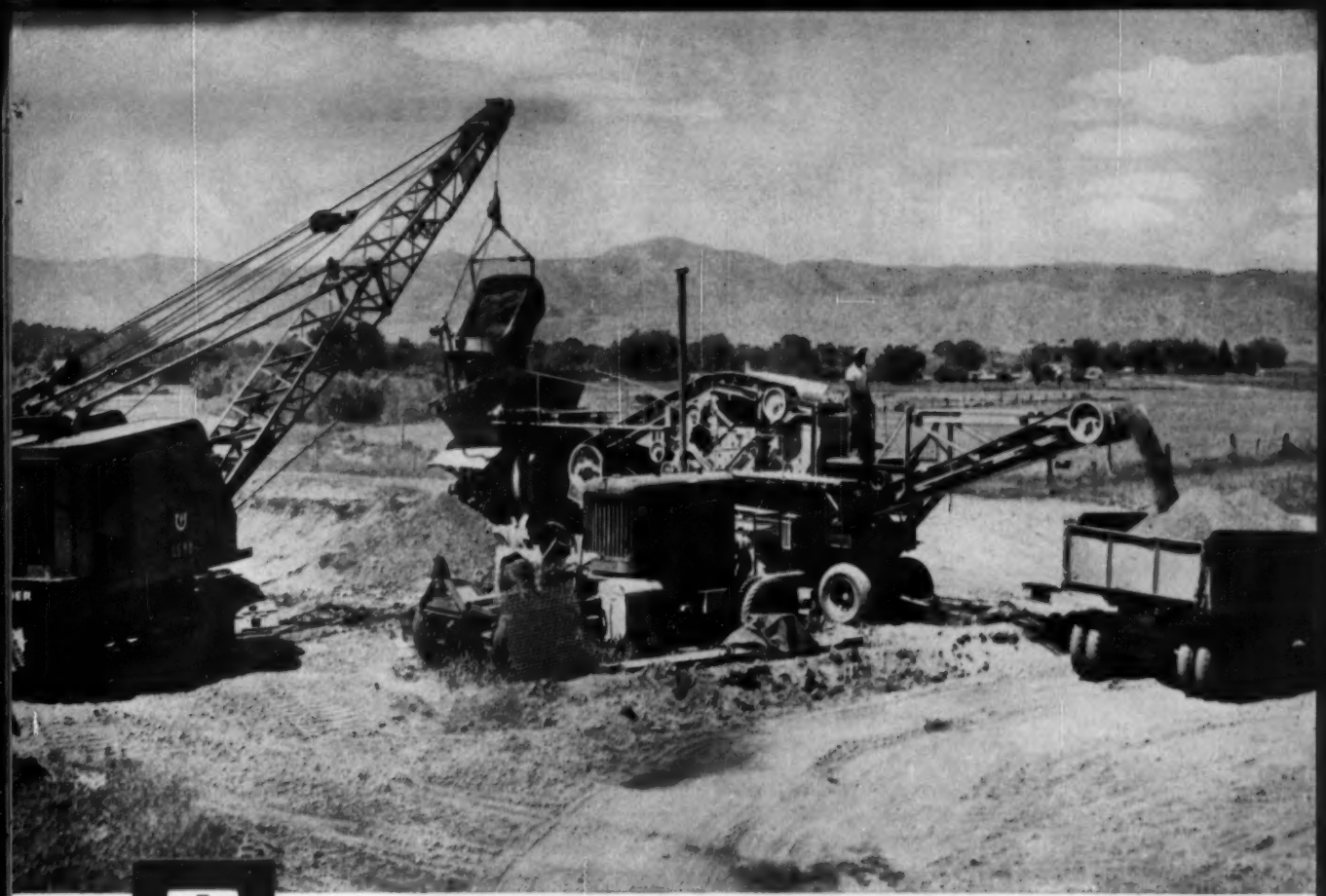
For dependable air power at lowest overall cost, it pays to specify Ingersoll-Rand compressors. They are available for handling air or gas at any pressure or capacity. Ask your I-R representative for further details.



Ingersoll-Rand

I-269 11 BROADWAY, NEW YORK 4, N. Y.

COMPRESSORS • PUMPS • AIR AND ELECTRICAL TOOLS • VACUUM EQUIPMENT • ROCK DRILLS • CONDENSERS • GAS AND DIESEL ENGINES



International diesel power units provide dependable, low-cost power for shovels, crushers, etc. Here, McMillan Constr. Co., Denver, uses 115 hp IH diesel to power ¼-yard dragline . . . 190 hp IH diesel on 200-ton-per-hour crusher.

# only INTERNATIONAL builds all these major advantages into diesel engines

**1. Full-flow lube oil filters lengthen engine life**

New replaceable plastic impregnated full-flow filters increase engine life by removing all harmful particles from the oil before it goes under full pressure to engine bearings. Exceptionally large filter area extends filter change period to 500 hours under normal conditions.

**2. New injection pump reduces maintenance**

Time proven International single and twin plunger pumps have been further simplified for longer life and lower cost maintenance. Scavenging gears and pump air pipe are eliminated . . . hardness of injection plunger increased for up to four times longer life.

**3. Drilled passages assure full-time lubrication**

You can be sure *all* engine bearings will be lubricated at *all* times. Lube oil is pressure-pumped through internal rifle-drilled passages that can't rupture or work loose.

**4. Clean combustion on low-cost fuel**

Trouble-free single orifice injection nozzles, and precombustion chambers mounted at 45° angle thoroughly mix fuel and air under all load and speed conditions. You get follow-through power strokes, clear exhaust, smooth idling on low-cost No. 2 fuel.

**5. Fast, sure starting . . . always**

Never mind cold—IH diesels work year 'round, even in the Arctic. Seconds-fast, they start in any weather on gasoline . . . and, seconds-fast, you switch to clean-burning, full-diesel power.

Six sizes of diesels, 52 to 190 hp, complete with radiator and fan. Also 12 models, 16½ to 200 hp, for gasoline, natural gas or LPG. See your nearest International Distributor for details.

INTERNATIONAL INDUSTRIAL POWER

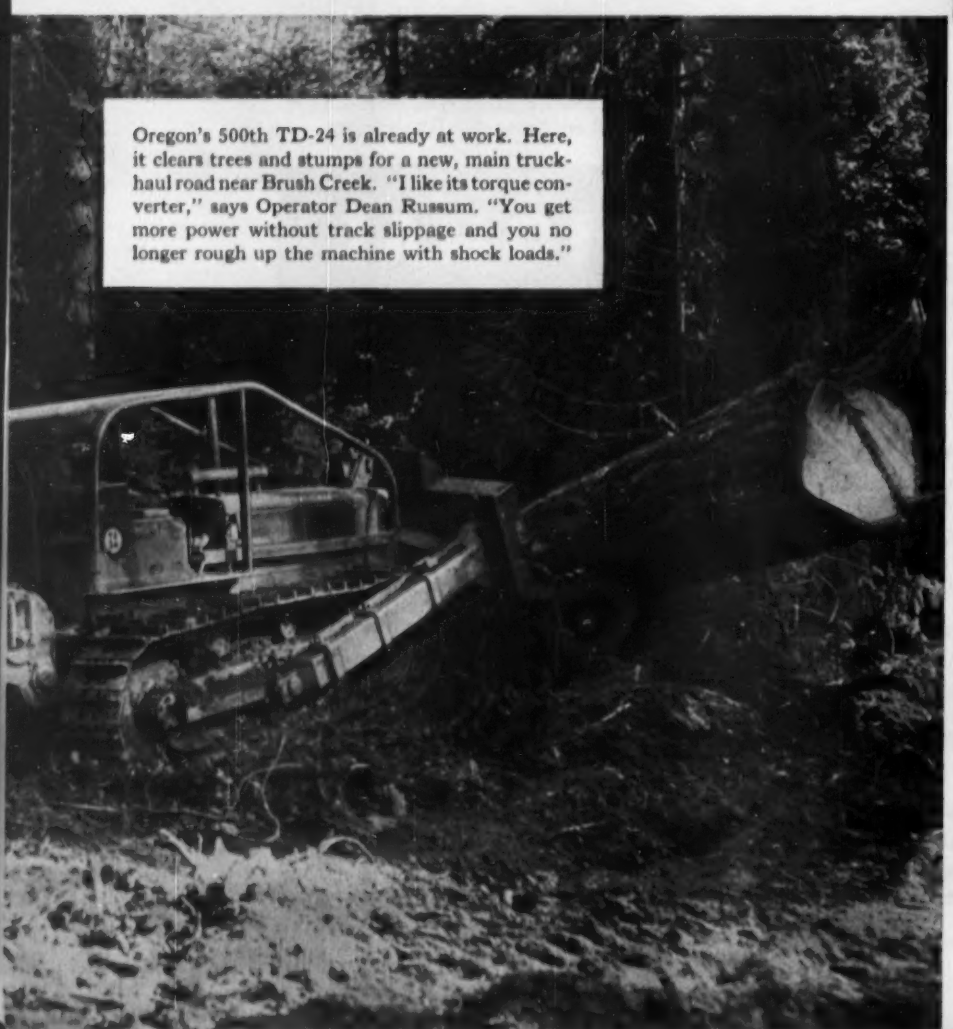
# 500 TD-24's

## For pioneering and road building in the rugged northwest

Howard-Cooper Corporation, one of International's 31 Western area distributors, have just delivered their *500th TD-24!*

You see this big 200 bhp crawler already at work for Wooley Logging Company, Drain, Oregon.

In rough, tough, Pacific Coast, big-scale logging, mining, and earthmoving, profitable production depends upon positive load-control, up-grade or down. *The TD-24 is the only tractor built that has planet-power steering—which gives you constant load control on both tracks when turning.* That's why the TD-24 out-produces the others so decisively, with dozer, arch, or scraper! Another big TD-24 advantage is its built-for-the-West construction. Records, on fleet after fleet, prove that TD-24's stand up under the toughest conditions—and consistently cost less for maintenance than any other make on tracks! TD-24 high-altitude performance is a big advantage, too—so is its seconds-fast, cold-weather starting and operating ease!

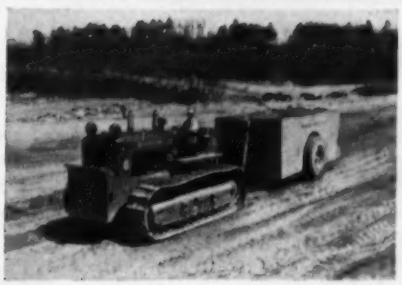


Oregon's 500th TD-24 is already at work. Here, it clears trees and stumps for a new, main truck-haul road near Brush Creek. "I like its torque converter," says Operator Dean Russum. "You get more power without track slippage and you no longer rough up the machine with shock loads."

## TD-24's

**6 for A. J. Orlando on Massachusetts Turnpike**—Most of the tractor work on this Whiteside (N.Y.) contractor's 4.89-mile, 2,500,000-yard, $3,340,000 section of the Massachusetts Turnpike is being done by TD-24's. One pushing 3 scrapers accounts for 4,500 pay yards every 10 hours (scrapers on 1,500-ft. one-way hauls). Others pull rippers, level fills, etc.

**If you're in the market** for a big tractor, you owe it to yourself to check the leader . . . the International TD-24. Five-hundred owners in just one area have proved it their "Best Buy." If it can so successfully and so profitably lick the tough rock, cold weather, and mountain grades of Oregon, it can successfully and profitably lick your high-cost jobs, too! Let us prove its advantages with a demonstration. Call to arrange time and place.



# PAY OFF ACROSS THE COUNTRY

**6 for J. D. Armstrong on Kansas Turnpike**—Of their 9 TD-24's, this Ames (Iowa) contractor reports all have run 5,000 hours or more before needing any repair work. Six on 1.7-mile, million-yard Turnpike section near Emporia, are towing 50-ton rollers, pulling and push-loading scrapers. On hauls of 700 to 2500 ft., they account for 5,000 pay yds. per day.

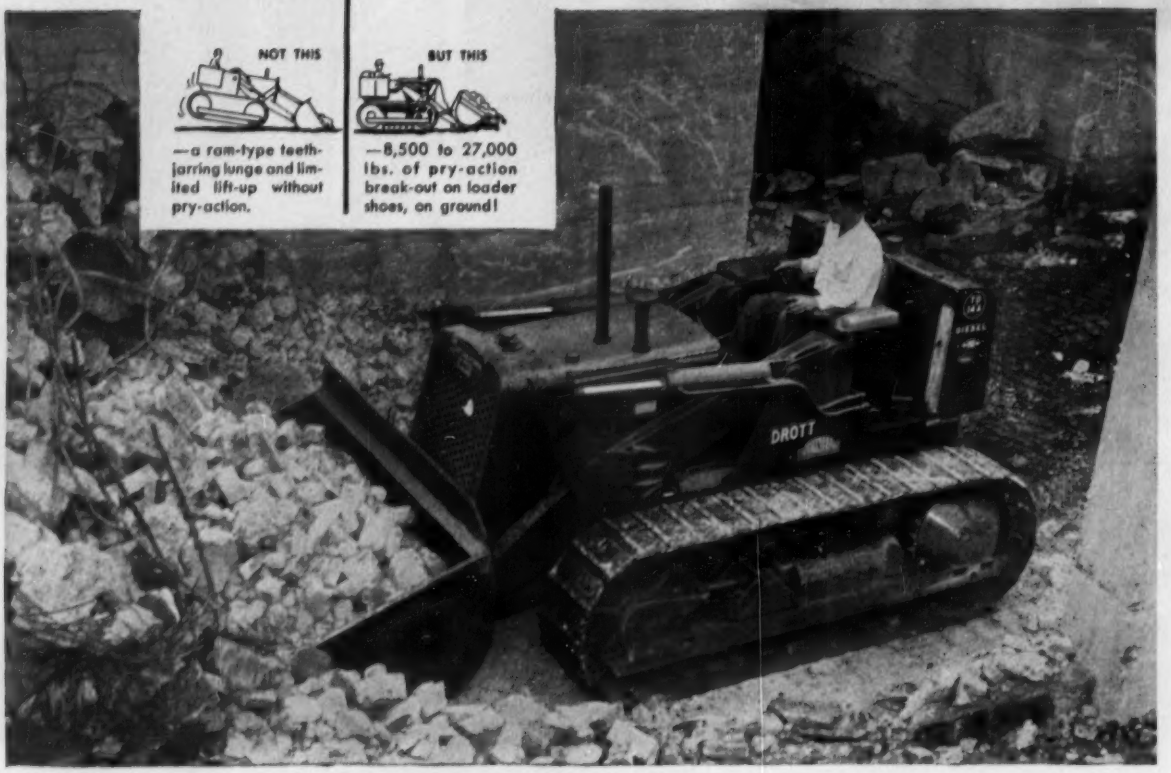
**2 for J. W. Moorman on Buford Dam, Georgia**—These "24's", two of the five now owned by Moorman, push-loaded scrapers or pulled 50-ton rubber-tired rollers, 18 hours every day for 18 months. On compaction, they averaged 180,000 cubic yards weekly for the 200-ft.-high, 1630-ft.-long main dam. Moorman's other TD-24's are used to push-load scrapers, and pull or push belt loaders.

**3 stripping overburden for Meyer Bros., Pennsylvania**—"Proven crawlers," says Partner George Meyer of his TD-24's. "We've used our 3 for 3 years now. They have good balance plus unmatched push power." Right now, rigs are removing 30 feet of shale and clay to uncover a 30-inch vein of bituminous coal. The 2 TD-24's do 80% of the job; a large shovel, 20%.


International Industrial Power

INTERNATIONAL HARVESTER

A machine size for every job . . . see your nearest INTERNATIONAL DISTRIBUTOR for details.


NOT THIS
—a ram-type teeth-jarring lunge and limited lift-up without pry-action.
BUT THIS
—8,500 to 27,000 lbs. of pry-action break-out on loader shoes, on ground!
DROTT

## How this exclusive DROTT pry-action break-out TURNS HARD DIGGING INTO "GRAVY" compared to "shoeless" loaders!

**Compare exclusive pry-action break-out capacity!**

See for yourself how patented International Drott pry-over-shoe break-out—*plus bucket roll-back*—gives you tremendous *extra* yardage-getting advantages . . . *COMPARE* these Skid-Shovel capacities: Model TD-6K3, 1-yard; break-out force 8,500 lbs. Model TD-9K3, 1½-yard; break-out force 11,500 lbs. Model TD-14K3, 2¼-yard; break-out force 17,000 lbs. Model TD-18K3, 3-yard; break-out force 27,000 lbs.

You can lunge into hard materials with the "shoeless" type of front-end loader—and get shorted with skimpy loads, pass after pass.

**Or you can apply the scientific lever principle of patented pry-over-shoe break-out of an International® Drott Skid-Shovel. And you'll get decisively more digging, bucket-heaping power than "shoeless" loaders of comparable size can deliver.**

Pry-action's tremendous yardage-getting force breaks compacted or frozen soils—lifts out embedded rocks—yanks up "anchored" materials. Also, this great *hydraulic pry-out power over big skid-shoes* shunts stresses directly into the ground—instead of to bucket, track frames, and final drives!

**And only an International Drott has the shock-swallowing protection of Hydro-Spring. This exclusive "impact-cushion" reduces the consequences of shock forces to operator and tractor by 67% or more—besides increasing production and eliminating most hydraulic hose failures! Owners credit this feature, alone, with boosting loader-tractor life a whopping 25 per cent!**

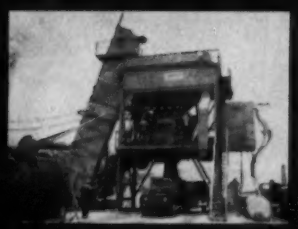
Your International Drott distributor invites you to prove with a demonstration how a Skid-Shovel turns hard digging into "gravy"—the bonus yardage way!

INTERNATIONAL HARVESTER

INTERNATIONAL® DROTT

Need 3-ton batches of bituminous concrete?
. . . 150 tons per hour of base course mix?
. . . low-cost production for commercial work?

# CEDARAPIDS has the answer



Model G60 produces 3 or more tons per batch, turns out 180 tons of asphaltic concrete per hour. Every new design feature known is incorporated in this plant.

Model G40 is just like the big G60 except for size and capacity. It's designed for jobs requiring around 120 tons per hour average.

Model H15 is a batch type plant built for medium sized jobs where capacities of 35 to 60 tons per hour are required. The stack-up, tower-type plant is easy to move and erect.

Model CM continuous flow twin-shaft mixing unit is complete in itself for producing cold mix for small "commercial" type jobs.

Model CGC gradation control unit, with the famous Cedarapids Horizontal Vibrating Screen, can be added to the Model CM to meet exacting specifications.

Model 3612 or 4816 "Packaged" Drier is used with the CM or H15 plant to produce hot mix or high type bituminous concrete.

Dry Skimmer Type Dust Collector is designed for compact, simplified installation, increased efficiency and low maintenance.

Master Plant continuous flow twin-shaft mixing plant, incorporating gradation control unit and drier, produces up to 200 tons of specification mix per hour.

Charging Hoppers and Feeders, available in various sizes and styles, assure a steady flow of material into all types of bituminous mixing plants. Ruggedly built for long life.

**IOWA**

**MANUFACTURING COMPANY**

Cedar Rapids, Iowa, U.S.A.

IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa, U.S.A.
Gentlemen: My next job is _____

☐ Please send details of the Cedarapids equipment you recommend.

Name _____

Title _____

Company _____

Address _____

City _____ Zone ____ State _____

# How Marfak cuts maintenance costs

Better and longer lasting protection — that's why contractors prefer *Texaco Marfak* and why *more than 555 million pounds of it have been sold!*

For chassis lubrication, *Texaco Marfak* is ideal because it won't pound or squeeze out. It stays on the job for extra protection against wear and rust. Parts last longer.

In wheel bearings, *Texaco Marfak Heavy Duty* seals out dirt and moisture — seals itself in. This means extra thousands of miles between scheduled lube jobs, extra long life for bearings, and greater braking safety. No seasonal change required.

For multi-purpose use, the new, lithium-base *Texaco Marfak Heavy Duty Special 2* pumps easily and lubricates effectively even at winter temperatures. It resists water washing and stands up in the

**TUNE IN:**
TEXACO STAR THEATER
starring JIMMY DURANTE
on TV Saturday nights.
METROPOLITAN OPERA radio
broadcasts
Saturday afternoons.

TEXACO

*Relocating highway along Columbia River.*

severest service. It's especially designed for those who want *just one lubricant* to handle all chassis, wheel bearing, water pump and other lubrication.

*Two other Texaco cost-reducers: Texaco Universal Gear Lubricant EP* to keep transmissions and differentials running smoothly. *Texaco Track Roll Lubricant* to protect and extend the life of crawler track mechanisms.

Let a Texaco Lubrication Engineer help you simplify and improve your maintenance lubrication. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

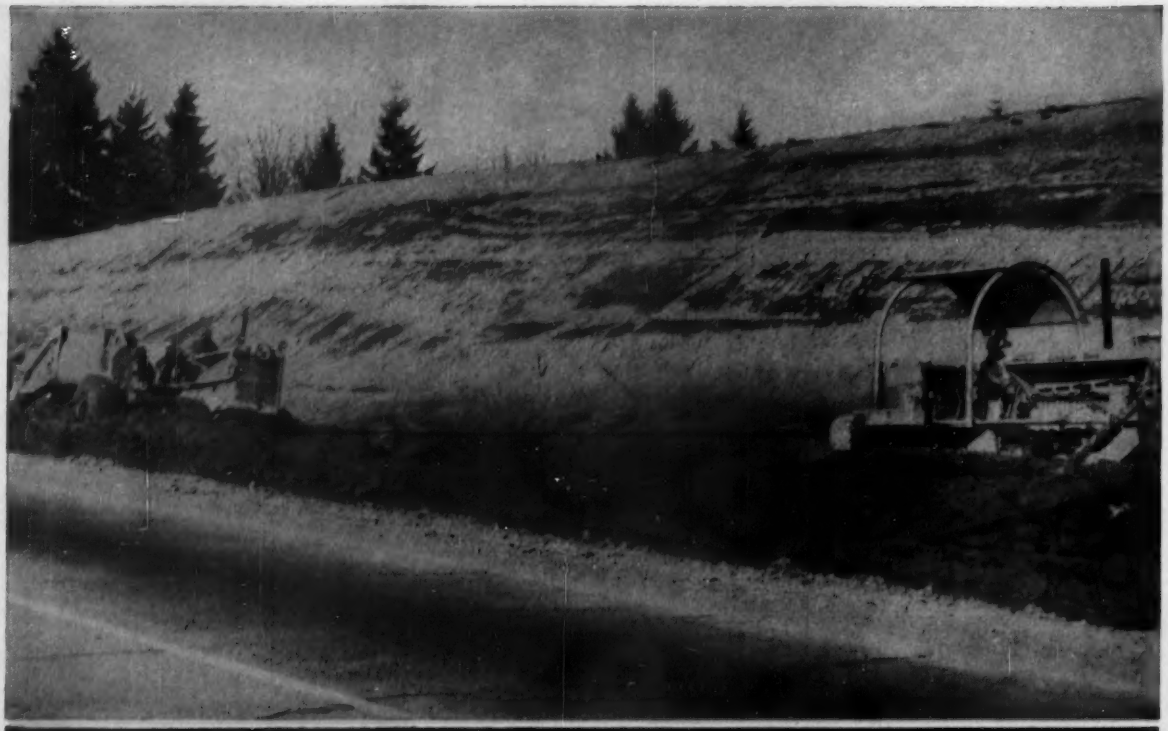
The Texas Company, 135 East 42nd Street, New York 17, N. Y.

## Texaco Simplified Lubrication Plan–

Enables you to handle *all* major lubrication with *no more than six* Texaco Lubricants. Cuts lubricant inventory, saves time, money and mistakes. A Texaco Lubrication Engineer will gladly develop a Plan especially to meet your requirements.

# Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT



# TRACTOR WINCH KEEPS SCRAPERS MOVING ON RAIN-SOAKED ROAD JOB

**Bad weather threatened to bog down scraper operations** on a particularly wet section of US 99 highway construction near Vancouver, Wash.

A Hyster winch mounted on a Caterpillar D8 Tractor soon had the job back on schedule.

**Tractor Winches are your best job insurance** because they are designed specifically to provide the tremendous pulling power needed to keep equipment on-the-move—even in the worst conditions. Hyster Winches, for example, increase pulling power up to 100% over tractor drawbar pull.

**Tractor Winches give long-reach pulling power** that can be extended the full length of the winchline —up to 400 feet. Loads in positions inaccessible to the tractor can be pulled by taking the winchline to the load while the tractor remains stationary. The load can then be winched to the desired position.

**Tractor Winches save tractor wear and tear.** Pulling an extremely heavy load with the tractor drawbar causes wear on the final drive and track assemblies. Sustained full-power operation may result in premature repairs and resulting high operating costs. Winches exert pulling power while the tractor remains stationary and cause no wear on tractor drive and track assemblies.

**Your Caterpillar-Hyster Dealer** will be glad to help you select the right winch for your job. See him today or write Hyster Company...2921 N. E. Clackamas Street, Portland, Oregon, or 1821 N. Adams Street, Peoria, Illinois.

## HYSTER COMPANY

"Matched Design" Tractor Tools for Caterpillar-built Tractors

# COSTS LESS

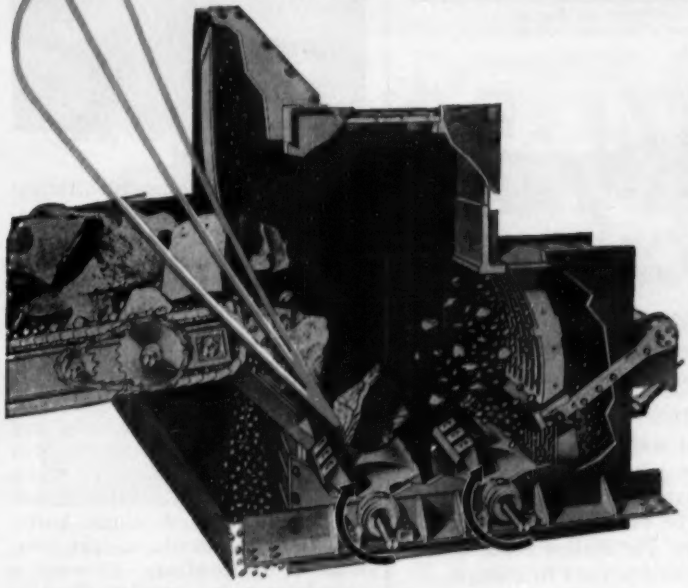
**High ratio of reduction. One machine does combined primary and secondary reduction job . . lower initial cost.**

# BREAKS CLEANER, FASTER

**Two hammer rotors turn in the same direction . . . . eliminate congesting of breaker, promote faster feeding, faster discharge, increased capacity.**

# UNIVERSAL IMPACT MASTER

**Featuring Universal's exclusive operating principle: Controlled Impact Action.**



**It's no wonder** Universal's Impact Master is the most efficient breaker you can buy. It can eliminate secondary crushers, take shovel-loaded run-of-quarry rock and reduce it to finished size in three seconds.

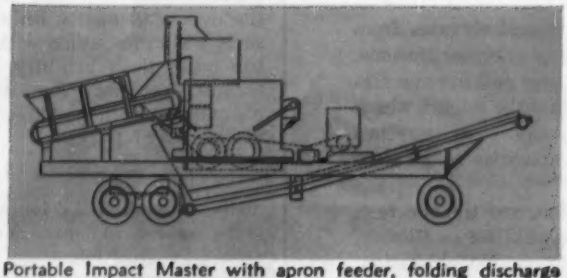
**Here is why** the Impact Master breaks rock faster and more economically. Both rotors turn in the same direction, assuring straight line flow of broken material away from hammers. Radial feed and absence of congestion provide unrestricted penetration of rock into the hammer circle for perfect impact. Hammers are always clean, always ready to break incoming rock most efficiently.

**This saves you money** because fewer hammer blows are required to do the job . . . less wear throughout machine . . . less horsepower.

**Result: increased capacity** of clean, cubical aggregate. What's more, finished product size is controlled easily with simple mechanical adjustments.

Universal's Impact Master provides capacities up to 1000 tons per hour. Get complete profit-making facts now. Write for literature.

**Available in portable or stationary set-ups.**



Portable Impact Master with apron feeder, folding discharge conveyor, three-speed transmission, and power.

**The method of impact breaking which permits control of feeding, breaking and product size.**

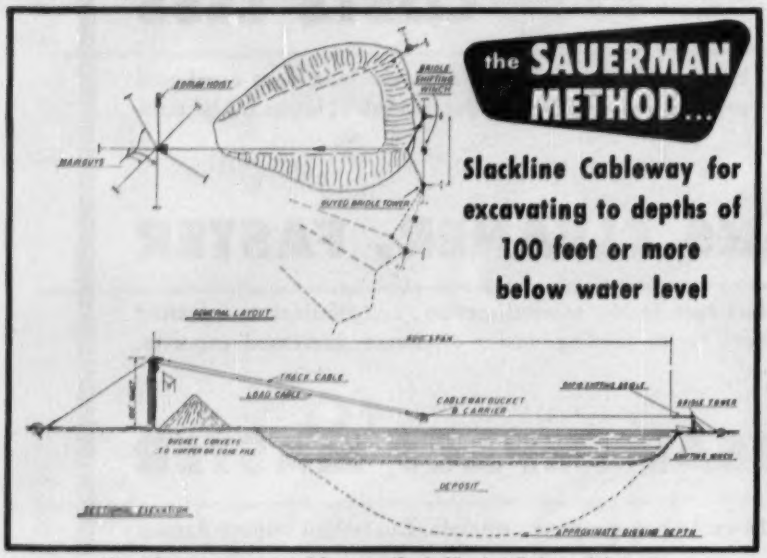
## UNIVERSAL ENGINEERING CORPORATION

**327 - 8th St., N.W., Cedar Rapids, Iowa**

A Subsidiary of Pettibone Mulliken Corporation,
4700 W. Division St., Chicago 51, Illinois

PETTIBONE UNIVERSAL
IN CEDAR RAPIDS SINCE 1906

# HOW TO DO A BETTER UNDERWATER EXCAVATING JOB




*Above drawing was prepared for a specific slackline installation and does not represent maximum spans. Rapid shifting bridle is not needed for many deposits.*

*Cableway at Cabinet Gorge Dam digs and hauls from tailrace 1000 ft. away. (Full details in Sauerman News No. 143.)*

*New York gravel producer switched to cableway for underwater operation of his pit. Average haul is 600 ft. from a 50-ft. depth (Sauerman News No. 141).*

You can remove more underwater material with a long reaching Sauerman Slackline Cableway. On job after job this machine has proved to be the most efficient for this type of operation. It is especially effective where the material to be excavated has good depth and will flow to the bottom of the cut. For shallow deposits or non-caving material a rapid shifting device is used to change the line of operation.

One man controlling the hoist digs, conveys and elevates from deposit to plant over spans of 1000 ft. or more . . . across streams, lakes, bogs or deep pits. The powerful load line pull insures digging penetration. Tensioning the track cable lifts the bucket which is inhauled at high speed and dumps automatically. Gravity return completes the fast operating cycle. Bucket capacities range from ⅓ to 3½ cu. yds.

To get fast, economical long range excavation, and the shortest, most direct way from pit to pile use a slackline cableway. Contact Sauerman for specific recommendations. No obligation. Request Catalog C, showing detailed specifications and photos of slackline cableways in action on all types of deep digging jobs.

**SAUERMAN BROS. INC.**

612 S. 28th AVE. | BELLWOOD, ILL.

Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks


**JOB TALK . . . Continued from page 10**

branches puncturing it or trucks backing into it. Another vulnerable appendage is the tail light., especially when the truck backs into stockpiles or hoppers. R. G. Kachmarik of Thiess Bros. Ltd., Brisbane, Australia, reports that simple shields made of scrap metal and wire mesh have greatly reduced the company's replacement bill. The face of the shield may be hinged to permit access to the light.

## Caution Signal

Metal caution signs with attached Neo-Flasher units are economical devices to keep motorists away from construction areas, according to C. J. Langenfelder & Sons. On his 5-mi job near Worcester, the contractor rents 25 of the units at a monthly cost of $20 each. They are easy to move about, and are maintained by the renting agency. The light flashes continually day and night. If the construction area is especially hazardous at night, Langenfelder adds another device. He strings a line of colored bulbs, sometimes hundreds of feet long, next to the roadway. Through a transformer, he connects them to the overhead utility lines, and inserts a simple device which makes the bulbs flash brightly in an alternate pattern. The method is cheaper and more effective than conventional flares.

---

**MORE LEGAL HELP** for contractors, architects and engineers now is available in the third volume on legal problems in construction by I. Vernon Werbin, an attorney and an engineer. The book covers 52 situations in which construction men may find themselves. It is written for laymen as well as lawyers. Its title: Legal Cases for Contractors, Architects and Engineers (McGraw-Hill).

Powered and lubricated by Cities Service, the nation's largest acceptable means of land transportation performs another herculean task for Frank W. Hake, Rigging Contractor.

# A MOVING EVENT: 241 TONS OVER SECONDARY ROADS!

"Our Best Move Was To Cities Service," says Partner Glenn Hake. "It's been paying off for eight years with less down-time, less oil consumption, greater period between overhaul. I heartily recommend Cities Service products for any rigging operation."

**More Craning, Less Straining** is another benefit enjoyed by the Frank W. Hake firm, using Cities Service products. Trucks, tractors, trailers, hoisting engines—all 36 pieces of mechanized equipment get Cities Service care.

Carrying a 91-ton transformer over secondary roads is just routine work for this mammoth rigging unit of the Frank W. Hake rigging firm, Philadelphia, Pa.

The nation's largest acceptable means of land transportation, the unit measures over 106 feet long, 12 feet wide, 17½ feet high and weighs 150 tons just by itself!

All told, that's 241 tons on the move, thanks to the power and lubrication of Cities Service petroleum products!

Why Cities Service? Partner Glenn F. Hake puts it this way: "When you work with the biggest piece of equipment, you've got to choose the petroleum products that do the biggest job . . . and that's Cities Service. For the past eight years, we've used Cities Service gasolene, diesel fuel, lubricants, and solvents—in *all* our transportation and construction equipment . . . trucks, tractors, trailers, truck cranes, hoisting engines, air compressors, and other equipment too numerous to mention. In fact, we even use Cities Service Fuel Oils to heat our business properties and our homes.

"We can truthfully state, without reservation, that we have had excellent service and performance at all times, and would heartily recommend Cities Service products to others."

If you're interested in Mr. Hake's suggestion, talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

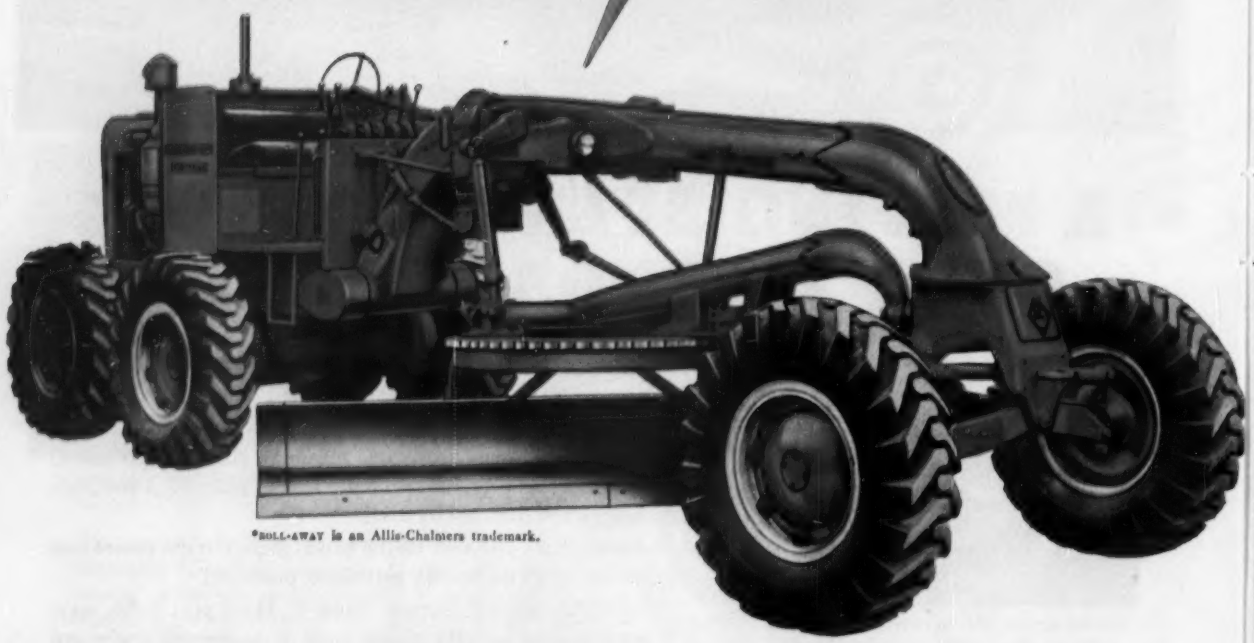
**CITIES SERVICE**

QUALITY PETROLEUM PRODUCTS

# NEW BIG SCALE PERFORMANCE

# NEW OPERATING EASE AND COMFORT

# ALLIS-CHALMERS BIG NEW



*ROLL-AWAY is an Allis-Chalmers trademark.

## Major advantages that mean more production . . .

**Powerful new Allis-Chalmers diesel** featuring exclusive "follow-through" combustion for smooth performance, clean combustion, extra-long life.

**Exclusive new ceramic clutch lining** sets new standards of long clutch life, keeps clutch operating longer between adjustments, reduces lever pull.

**All-new toggle-type controls** give a *Forty Five* operator precision control with positive "feel" — in addition to easy finger-tip action regardless of load.

# Forty Five MOTOR GRADER

**120 HORSEPOWER • 23,800 POUNDS**

The *Forty Five* is a truly modern heavy-duty motor grader . . . designed for progress and built to *today's* standards of accuracy, dependability, operating ease and low cost. On any construction or maintenance job, you'll see all the advantages of balanced power, weight, traction and proper speeds . . . plus brand new advantages for the operator and mechanic that no other heavy-duty grader offers.

We invite you to check the features shown here. Then for the full story on the *Forty Five* — including extra-big clearances, exclusive ROLL-AWAY* moldboard, single-member tubular frame and fully enclosed power steering —see your nearby Allis-Chalmers dealer.

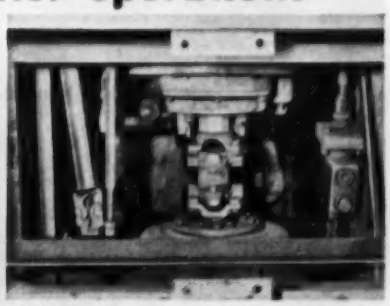
CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

**ALLIS-CHALMERS**

**. . . less maintenance . . . easier and better operation!**

**New accelerator-decelerator pedal** lets the operator increase or decrease engine speed with his foot — without changing his hand throttle setting.

**"Box seat" comfort and visibility.** Foam-rubber seat adjusts for sit-down or stand-up operation. Flat, roomy platform has tapered corners for top blade visibility.



**Matchless servicing accessibility.** Unit construction permits easy service or removal of clutch, transmission or engine without disturbing adjacent parts.

The Barber-Greene line is made up of standardized, pre-engineered components including a wide range of Frames, Trusses, Drives, Take-ups, Feeders, Hoppers, Belt Cleaners, Backstops, Brakes, Housings, Walkways, Spouts, Hoods, Gates, Supports, etc.

# CONVEY

**CONVEY** your materials the cheapest way.

**CONVEY** with standardized units for faster quotation and delivery.

**CONVEY** with pre-engineered components, eliminating special engineering time and expense.

**CONVEY** with factory-assembled, factory-aligned components for faster erection, and easier future alteration.

**Ask for the Barber-Greene 192-page Conveyor Catalog.**

54-40-PE

WRITE for INFORMATION

descriptive literature . . . sound movies

cost studies . . . nearby job inspection . . . plant layouts

**Barber-Greene**

AURORA, ILLINOIS, U.S.A.

BG

CONVEYORS LOADERS DITCHERS ASPHALT PAVING EQUIPMENT

## *"Oh yes it can!" said Darin & Armstrong Detroit contractors..."with Atlas Compo Forms!"*

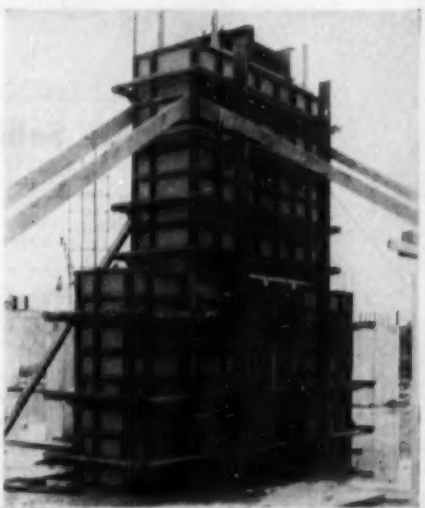
There was plenty of reason to doubt that prefabricated forms could be used to pour the huge addition to a Michigan automotive plant. The job included battered walls with a big haunch; walls that had to be poured against an existing structure; and forming that had to be half completed before ties could be inserted.

But Darin and Armstrong carefully studied the job requirements and decided Atlas Compo Forms offered the very best way to handle all problems and get the job's 60,000 yards of concrete poured within contract time.

Result: the job progressed smoothly and on schedule from the very beginning. Even the trickiest parts of the forming were done in stride.

Whenever you have a job when repeated-use forms might be used, confer with Irvington engineers. They probably can save you time and money.

So much steel reinforcement went into this wall that form ties had to be inserted *after* both sides of the forms were up. With the exclusive Compo tying system this readily can be done.

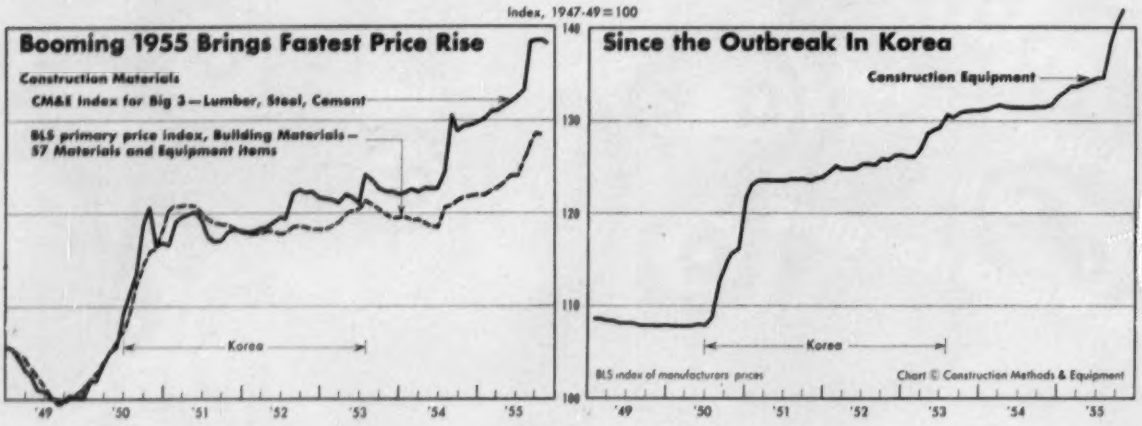


Y-shaped piers 17' high, formed with Atlas Compo form sections and steel channel yokes, were poured continuously. 90% of internal tying eliminated. Stripped forms crane handled in large units eliminating reassembly.

**IRVINGTON FORM & TANK CORPORATION**

DEPT. EN 24 20 VESEY STREET NEW YORK 7, N. Y.

# *It's Your Business . . .*


Index, 1947-49 = 100
Booming 1955 Brings Fastest Price Rise
Construction Materials
CM&E index for Big 3—Lumber, Steel, Cement
BLS primary price index, Building Materials—57 Materials and Equipment Items
Korea
'49 '50 '51 '52 '53 '54 '55
140 130 120 110 100
Since the Outbreak In Korea
Construction Equipment
Korea
BLS index of manufacturers prices
Chart © Construction Methods & Equipment
'49 '50 '51 '52 '53 '54 '55

## Sharply Rising Costs Force Contractors to Raise Their Bids

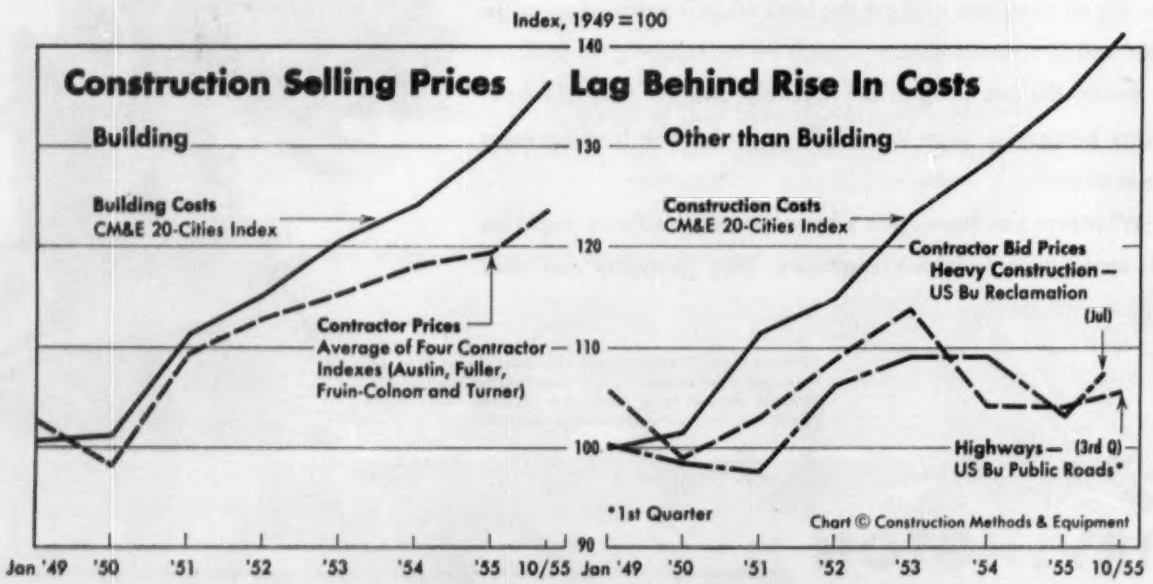
Prices are catching fire from the construction boom. Price tags on construction materials and equipment are going up faster than at any time since the rapid inflation that followed the outbreak of the Korean War (see chart above). Contractors have no choice but to pass on these hefty cost increases. This shows up clearly in the substantial increases this year in contractor building prices and bids on highway and heavy engineering types of construction (see chart below).

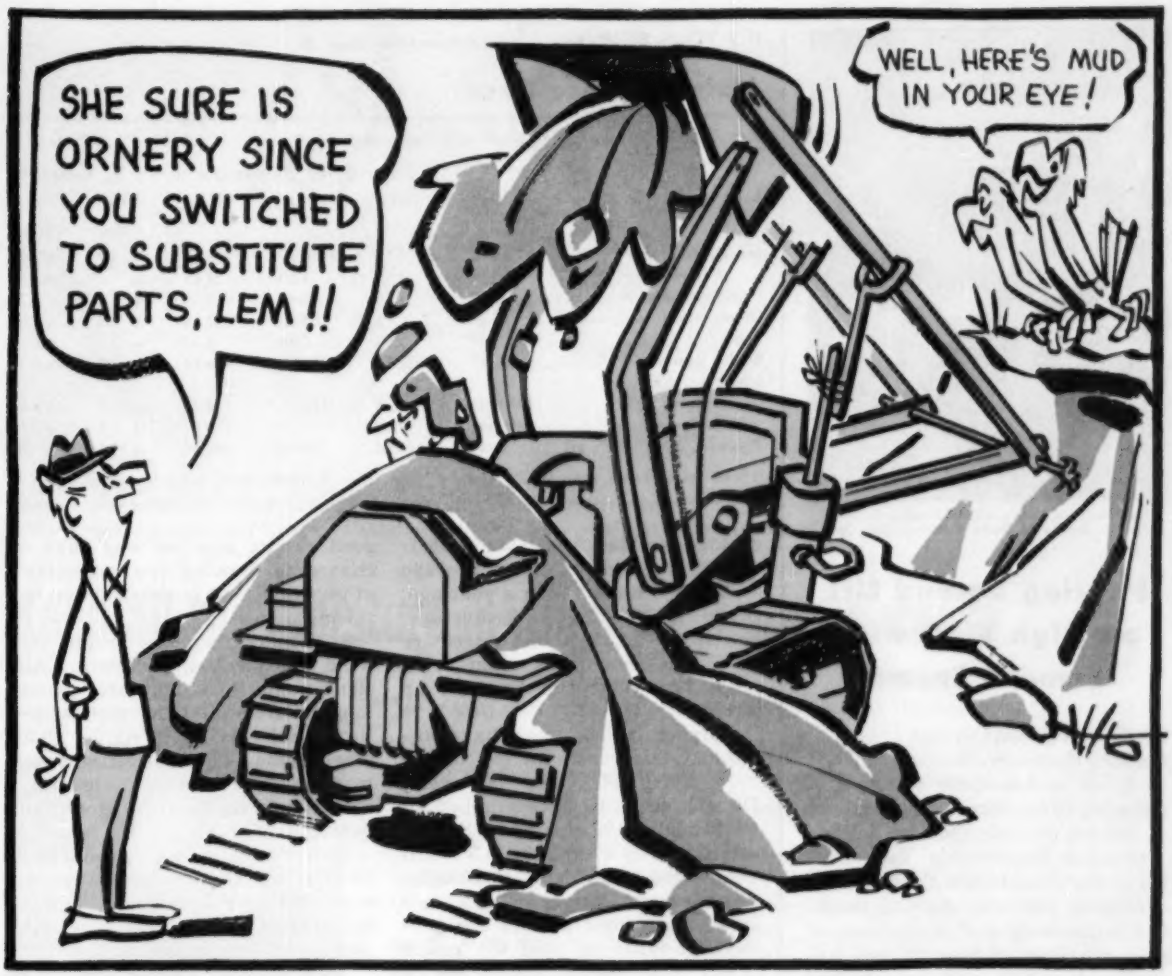
Many contractors entered 1955 with their costs and profit margins trimmed to the marrow by heavy competition during 1953 and 1954. Their ingenuity in cutting costs helped them absorb most, and in some cases all, of the steady rise in labor and materials costs during the last two years. This year, however, many contractors just had to pass on the cost advances.

This year's construction boom has spawned the biggest materials and equipment price increases in five years. Sellers markets have returned for practically every key material and equipment line, and many manufacturers who were caught in a cost-price squeeze are getting relief by hiking their prices in this rising market.

### Steel Leads Price Rise

Biggest price increase this year among key construction materials is in steel. Base mill prices of structural steel shapes and reinforcing bars have risen more than 8%, more than double the per-


Index, 1949 = 100
Construction Selling Prices Lag Behind Rise In Costs
Building
Building Costs
CM&E 20-Cities Index
Contractor Prices
Average of Four Contractor Indexes (Austin, Fuller, Fruin-Colnon and Turner)
Other than Building
Construction Costs
CM&E 20-Cities Index
Contractor Bid Prices
Heavy Construction—US Bu Reclamation
(Jul)
Highways—(3rd Q)
US Bu Public Roads*
*1st Quarter
Chart © Construction Methods & Equipment
140 130 120 110 100 90
Jan '49 '50 '51 '52 '53 '54 '55 10/55
Jan '49 '50 '51 '52 '53 '54 '55 10/55




Down time is no joke. It happens, though. Maybe when intake and exhaust valves go bad.

If you replace with genuine Caterpillar valves, here's what you're sure of: valves designed to *fit properly* in your Caterpillar engine, and that means heads held to amazingly close tolerances, stems accurately machined, keeper tapers precision-ground, faces machined true to the center line of the stem. You're sure of valves *hardened* for longer wear. All around, you're sure of *less* down time in the future.

If you replace with substitute valves—can you be sure of anything?

**Better get genuine Caterpillar parts every time.**

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

*CAT* valves are made of special nickel-chromium alloy steel. Even at high operating temperatures, they resist distortion, corrosion and erosion.*

**CATERPILLAR***

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

New Dormitory, Lewis and Clark Campus, Portland, Oregon, Donald M. Drake Company, Gen. Con.


## Pouring Second Lift on High Wall with Symons Forms

24 ft. wall poured in two lifts with Symons Forms. Scaffolding attached to forms makes easier setting and stripping of top forms. Note absence of bracing and minimum waling.

Symons Engineering and Customer Service includes the details of a forming job from start to finish. Our engineering staff is experienced with all types of forming and will furnish complete form layouts and job cost sheets on form work—at no charge to the customer. This service enables the contractor to get a clear picture of his job (its cost, bill of materials and labor saving methods).

Our salesmen are trained on form erection, pouring and stripping methods and give regular on-the-job service.

Symons Forms, Shores and Column Clamps may be rented with purchase option, all rentals to apply on purchase price.

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Firm
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IT'S YOUR BUSINESS . . . Continued from page 28

## Materials Price Trends

As reported to Construction Methods & Equipment

| Material | Unit | Price as of November 1 1953 | 1954 | 1955 | % Change 1953-1954 | 1954-1955 |
|---|---|---|---|---|---|---|
| Steel, structural | cwt‡ | $ 4.10 | $ 4.25 | $ 4.60 | + 3.7 | +8.2 |
| reinforcing | cwt‡ | 4.15 | 4.30 | 4.65 | + 3.6 | +8.1 |
| Portland cement | bbl* | 3.35 | 3.46 | 3.56 | + 3.3 | +2.7 |
| Ready-mixed concrete | cy* | 11.96 | 12.23 | 12.66 | + 2.3 | +3.5 |
| Sand | ton* | 2.17 | 2.25 | 2.37 | + 3.7 | +5.4 |
| Brick, common | M* | 32.91 | 33.24 | 34.88 | + 1.0 | +4.9 |
| Lumber, 2x4's | | | | | | |
| Douglas fir | Mftbm* | 99.88 | 113.71 | 119.79 | +13.8 | +5.3 |
| Southern pine | Mftbm* | 91.53 | 93.23 | 100.97 | + 1.9 | +8.3 |
| Plywood, DF, ⅜" ext | Msf† | 171.00 | 190.00 | 190.00 | +11.1 | 0 |

‡ Base price, 3-mill average * Carlots, f.o.b. city † Seattle base price

centage rise last year (see table).

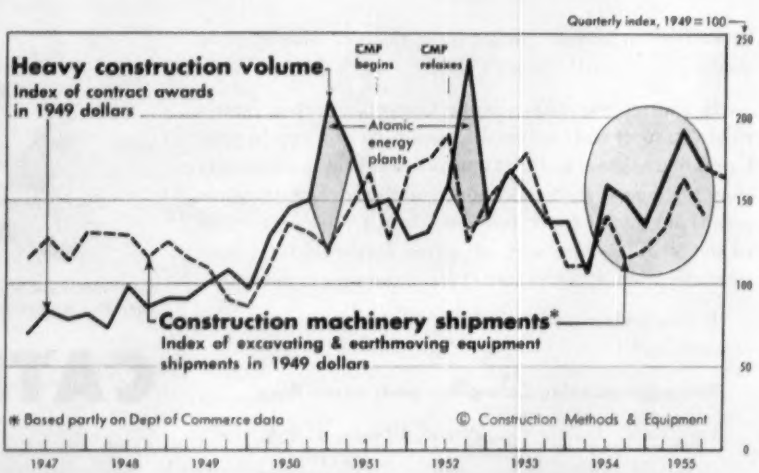
Portland cement prices average nearly 3% higher than a year ago, based on CM&E's 20-cities average, and ready-mix concrete prices are up 3.5%. Sand has risen 5.4% since last year, and brick is up about 5%.

Lumber prices also have increased this year. On top of the very sharp 14% rise last year, Douglas fir 2x4's have climbed an additional 5.3% this year. Southern pine is up even more, 8.3% this year. One bright spot is Douglas fir plywood prices which are steady. Plywood dealers are persuading mills to hold the prices down. They reason: you're making good profits now so why take a chance of slowing the expansion of plywood's use in construction by raising prices.

Still more increases are in the wind for steel and cement. All signs point to higher steel prices long before mid-1956, and structural steel may be hit harder than other items. That's because profit margins on structurals are less favorable than on flat rolled steel, for example.

Universal Atlas has announced a 25-cent per barrel increase in cement effective January 1. This is the biggest single increase in cents per barrel ever made by this firm.

*(Continued on page 176)*




## EQUIPMENT SHIPMENTS: 3RD QUARTER RECORD

Equipment makers set a new high in shipments of excavating and earthmoving equipment for the third quarter. Though declining seasonally from the second quarter, CM&E's Equipment Shipments Index reached 143, a peak for any third quarter on record. Shipments topped the same quarter a year ago by 23%, and they were 3% above the previous third quarter high in 1953.

It is the fourth consecutive quarter in which shipments have topped the year-ago volume. The CM&E Index measures the value of equipment shipments, is based on average 1949 quarterly shipments as 100.

*Wherever you lay concrete, cure it under a blanket of VISQUEEN film . . . get better, longer-lasting concrete.*

# Keep all the moisture in when you cure concrete

*Close openings with VISQUEEN film. Work in warm comfort and protect interiors during cold or stormy weather*

*VISQUEEN film is best permanent moisture barrier under concrete slabs or floors. Wide widths and light weight mean low laying costs.*

*Cover bulldozers, tractors, scrapers. Leave outdoors in any weather. Save thousands every winter on your equipment storage costs.*

Now you can cure concrete better at much less labor cost. Use VISQUEEN film as a curing blanket. Widths to 32 feet. Any reasonable length. Light, easily handled VISQUEEN is quickly placed over green cement without marring the fresh surface. VISQUEEN locks in the moisture. No need to wet down during cure. VISQUEEN is tough, won't puncture easily—can be used over and over. 1000 sq. ft. of 4 mil VISQUEEN weighs less than 20 lbs.

Investigate the money-saving possibilities inherent in this inexpensive, super-quality film.

***Now, you can get VISQUEEN in widths to 32 feet.***

**Important!** *VISQUEEN film is all polyethylene, but not all polyethylene is VISQUEEN. Only VISQUEEN has the benefit of research and resources of the VISKING Corporation.*

***look for this name on the selvage!***

VisQueen®

*For details, clip coupon, attach to your letterhead and mail.*

VisQueen® film . . . a product of

**THE VISKING CORPORATION, Box CM-12-1410**

*Plastics Division, Terre Haute, Indiana*

*World's largest producers of polyethylene sheeting and tubing*

**In Canada: VISKING Limited • Lindsay, Ontario**

**In England: British VISQUEEN Limited • Stevenage**

Name_____

Title_____

# *Cutting a mountain down to size!*

## Le Roi Tractair provides low-cost air to help dig 30'-deep cut in hard rock

On this job in Arizona, the mobility of Tractair really paid off. It allowed the contractor to make this 30-ft.-deep drainage cut at the same time he was working on the main part of his contract.

Because Tractair is self-propelled, with a low center of gravity, it travelled over this rocky terrain with ease. There was no tying up of trucks and men to move compressed air and tools to the spot. Tractair, with its 125 cfm capacity, took care of the whole operation. And the savings to the contractor were substantial.

The versatility of Tractair, since it is a combination 42-hp wheel tractor and 125-cfm compressor, can save you money, too. You can use it for drilling, tamping, driving form pins, breaking pavement, and a host of "odds and ends" jobs. Write for complete details. T-34

**LE ROI** *Division of Westinghouse Air Brake Co.*

Milwaukee 14, Wisconsin

**NATION-WIDE SALES-SERVICE NETWORK**

ALABAMA: Birmingham — ARIZONA: Phoenix — ARKANSAS: Harrison, Little Rock — CALIFORNIA: Bakersfield, Berkeley, Fresno, Los Angeles, Redding, San Francisco — COLORADO: Denver, Grand Junction — CONNECTICUT: Hartford — DELAWARE: Dover — FLORIDA: Jacksonville, Miami, Tampa — GEORGIA: Atlanta, Augusta — IDAHO: Boise, Idaho Falls, Sioux Falls, Twin Falls, Wallace — ILLINOIS: Chicago — INDIANA: Indianapolis, South Bend — IOWA: Cedar Rapids, Des Moines, Sioux City, Waterloo — KANSAS: Kansas City, Wichita — KENTUCKY: Lexington, Louisville, Madisonville — LOUISIANA: New Orleans, Shreveport — MAINE: Augusta — MARYLAND: Baltimore, Hyattsville—MASSACHUSETTS: Hyde Park, Worcester—MICHIGAN: Detroit, Grand Rapids — MINNESOTA: Duluth, Minneapolis — MISSISSIPPI: Jackson — MISSOURI: Joplin, St. Louis, Springfield — MONTANA: Billings, Great Falls — NEBRASKA: Lexington, Lincoln, Omaha — NEVADA: Reno — NEW HAMPSHIRE: Manchester — NEW JERSEY: Cranford, Kingston — NEW MEXICO: Albuquerque — NEW YORK: Albany, Binghamton, Buffalo, Massena, Rochester, Saugerties, Syracuse, Whitesboro, Woodside (L. I.) — NORTH CAROLINA: Charlotte — NORTH DAKOTA: Grand Forks — OHIO: Cincinnati, Cleveland, Columbus, Dayton, Toledo — OKLAHOMA: Oklahoma City, Tulsa—OREGON: Portland—PENNSYLVANIA: Harrisburg, Philadelphia, Pittsburgh, Wilkes Barre — RHODE ISLAND: E. Providence — SOUTH CAROLINA: Columbia — SOUTH DAKOTA: Sioux Falls — TENNESSEE: Chattanooga, Knoxville, Memphis, Nashville — TEXAS: Beaumont, Dallas, El Paso, Houston, Lubbock, Midland, San Antonio — UTAH: Salt Lake City—VIRGINIA: Richmond, Roanoke — WASHINGTON: Seattle, Spokane — WEST VIRGINIA: Clarksburg, South Charleston — WISCONSIN: Green Bay, Milwaukee — WYOMING: Casper.

# Westinghouse announces new welder line with exclusive "wide-amp" control

Westinghouse proudly introduces a complete, new line of welding machines featuring new RA (d-c) and TA (a-c) industrial lines and a complete, new series of utility welders including an a-c—d-c machine.

**Wide-Amp Control** with single range on industrial rated machines provides the widest usable current range in the industry . . . a single range . . . from a soft, quiet, low-intensity arc for thin sheet metal work to an arc current well above the rated capacity of the machine for heavy jobs.

**Wide-Amp Control** with single range enables you to use safely these high welding currents because of *exclusive* Westinghouse De-ion® circuit breaker which constantly guards the windings against excessive temperatures.

**Wide-Amp Control** also provides new and *exclusive* Westinghouse adjustable ARC DRIVE CONTROL on the d-c machines; arc drive control, in turn, gives a continuous additional surge of power where needed to prevent electrode sticking and arc snuffing. Convenient *polarity reversing switch* permits easy, fast changing.

Westinghouse, the pioneer in rectifier and industrial a-c welders, continues to lead the way. Order your new welder with *exclusive* single-range WIDE-AMP CONTROL from your Westinghouse distributor or nearest Westinghouse office.

Or write for free information to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21923

YOU CAN BE SURE...IF IT'S

Westinghouse

Drilling blast hole in basalt during construction of new road in Gifford Pinchot National Forest, Washington. *Contractors:* Murray Bros. and Stanford Construction Co., Bend, Oregon; Drill steel supplied and reconditioned by Brunner & Lay Corp., Westland Equipment Division, Portland, Oregon.

# Operation Salvage

Recently the Douglas-fir bark beetle attacked acres of towering fir stands in the Wind River drainage of the Gifford Pinchot National Forest in southern Washington. After such an attack, if the trees are permitted to stand for an appreciable length of time, the sapwood deteriorates, and eventually the timber becomes useless. To get the timber to processing plants while it still was serviceable, Operation Salvage was devised by the United States Forest Service, Department of Agriculture.

First step was rough grading for a 9.2-mi road through virgin territory, so that the logs could be hauled to main arteries economically. The Wind River-Meadow Creek road, built to accommodate 1½ lanes of traffic, will have a gravel surface and eventually may connect with the Twin Buttes Huckleberry Fields and the Mt. Adams area.

To prepare the terrain for blasting, drilling crews used Bethlehem Hollow Drill Steel to form holes as deep as 100 ft in alternating stretches of hard and soft basalt. The drill steel, 1¼-in. round in wagon drills, and ⅞-in. hexagon in jackhammers, was used with one-use steel bits.

For any type of rock-removal job, it's hard to beat Bethlehem Hollow. This top-quality drill steel provides economical drilling in virtually every type of rock because it is carefully rolled from steel with a high degree of toughness and fatigue-resistance. Bethlehem Hollow has a wide quenching range, and is easy to heat-treat for the ideal balance of hardness and wear-resistance. It also makes long-wearing threads and tough shanks.

Bethlehem Hollow is furnished in rounds, hexagons and quarter octagons, usually in lengths of 18 to 25 ft. Longer lengths can be supplied to meet special needs. It's drill steel that you'll find well worth keeping in mind.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

**BETHLEHEM HOLLOW DRILL STEEL** CARBON ULTRA-ALLOY

BETHLEHEM STEEL

# At the Denver water dam one hose takes the place of many...

The immense water-supply dam just completed for the city of Denver, Colorado, required over 8,000 feet of air hose in its construction.

The experienced contractor who handled the job picked U. S. Royal Cord Air Hose for several hard-boiled reasons:

(1) U. S. Royal Cord Air Hose not only handles air—but also *water—and water under the extreme pressures required in washdown.* He used the hose on vibrators to consolidate the concrete—he used it as part of cooling lines on face of dam—on pneumatic tools, on sump pumps and sludge pumps, rock drills, chipping hammers, air wrenches.

(2) The contractor found there was no need to go easy on U. S. Royal Cord. *No* need for cribbing, no time wasted by workers in selecting or storing away special hose for special jobs. *No money tied up in stocking specialized hose.*

(3) Valuable pay hours saved—hour after hour, week after week. U. S. Royal Cord is *built like a tire*—that's why it can be kicked around and abused and made to do jobs you don't expect from an air hose.

You can save yourself plenty of worry by standardizing on "U. S." Hose. Performance after performance demonstrates the folly of wasting money on short-lived, cheap hose. You can get "U. S." Hose at any of the 27 "U. S." District Sales Offices.

*"U. S." Research perfects it..."U. S." Production builds it... U. S. Industry depends on it*

**UNITED STATES RUBBER COMPANY**

**MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.**

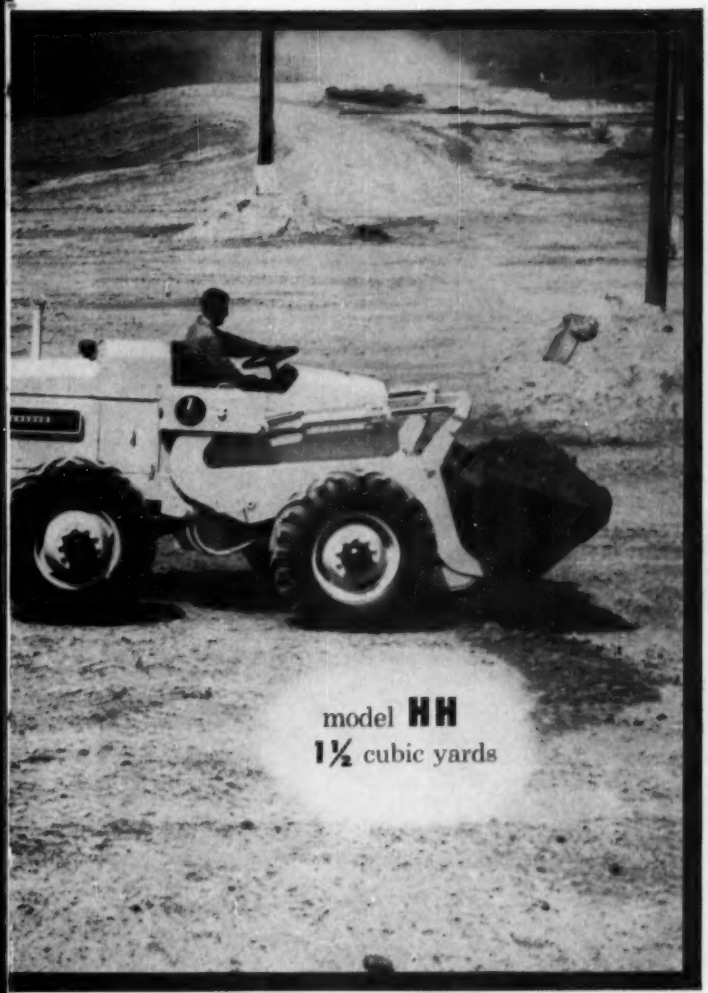
Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

# the Big Three in

## All new in design... New in performance

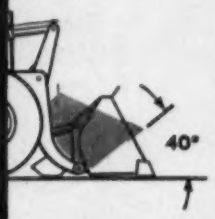
If you want the utmost in wheeled tractor-shovel performance, you want four-wheel-drive, and for the finest in four-wheel-drive you now have a choice of these three "PAYLOADER" sizes. They're all *new*, and each one is way ahead of its class in digging power, carrying capacity, stability, safety and operator comfort. They all feature an amazing new bucket action and boom arm design that is the big reason for the new performance pace they are setting for contractors, public bodies, mines, quarries, utilities.

There's more horsepower per bucket capacity and many other proven Hough advantages that boost output and lower the cost of digging, scooping-up, loading, moving and piling earth and bulk materials. They all feature torque converter drives and multiple speeds in both directions as well as a new closed, pressure-controlled hydraulic system that minimizes dirt-intake and oil-foaming troubles. Your Hough Distributor is ready to demonstrate these great new "PAYLOADER" units and what they can do for you.



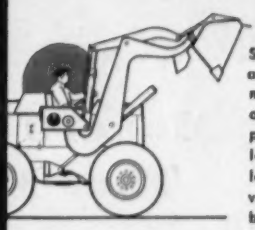
### POWERFUL PRY-OUT ACTION

Tremendous pry-out force is obtained by using the breakout pads on the ground as a fulcrum for leverage. The load forces opposing the pry-out action are thus transferred to the ground through the pads instead of to the axle, wheels and hydraulic system of the machine.




### 40° BREAK-OUT at Ground Level

You can get HEAPED BUCKET LOADS and you get them FASTER and EASIER WITH THIS NEW BUCKET ACTION. Most important of all — you KEEP BIGGER PAYLOADS — because the bucket can be tipped back a full 40 degrees at ground level before it is raised, eliminating spillage.



### SAFETY and STABILITY

Special boom-arm shape and positioning keeps moving members out of operator's reach at all positions. Close, low, load-carry position and longer wheelbase provide stability and balance for fast maneuvering — with safety.

# Four-Wheel Drive

Your Hough Distributor's continues to be the place to get the most performance and satisfaction for your tractor-shovel dollar. For he sells the "PAYLOADER" line of wheeled tractor-shovels — the pioneer line and the most-proven, most complete line available. He has a "PAYLOADER" size to meet your requirements, whether for four-wheel-drive, rear-wheel-drive or front-wheel-drive types — along with the finest parts and service facilities to protect your tractor-shovel investment.

**PAYLOADER®**
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

**THE FRANK G. HOUGH CO.**
706 Sunnyside Ave. Libertyville, Illinois

Send full information on new "PAYLOADER" Tractor-Shovels

☐ Model HU ☐ Model HH ☐ Model HO

Name .....
Title .....
Company .....
Street .....
City .....
State .....

# Modern Truck Features That Mean Business!

**Chevrolet trucks have got it! A full list of modern features that mean better business—on the job today and at trade-in time tomorrow!**

When you get right down to it, any truck without all of Chevrolet's Task-Force features is still living in the past. Why risk losing money with an old-fashioned truck—both on the job and at trade-in time—when you can get a Task-Force model with the industry's most advanced features?

**Most modern power—V8 or 6.** There's longer life in Chevrolet V8's (extra cost in most models). With their short-stroke design—shortest of any leading truck—you can count on less friction and wear per mile. If you go for sixes—Chevrolet's gas-saving valve-in-head sixes are famous for their dependability. All engines are sparked by a modern 12-volt electrical system for quicker starting and smoother going!

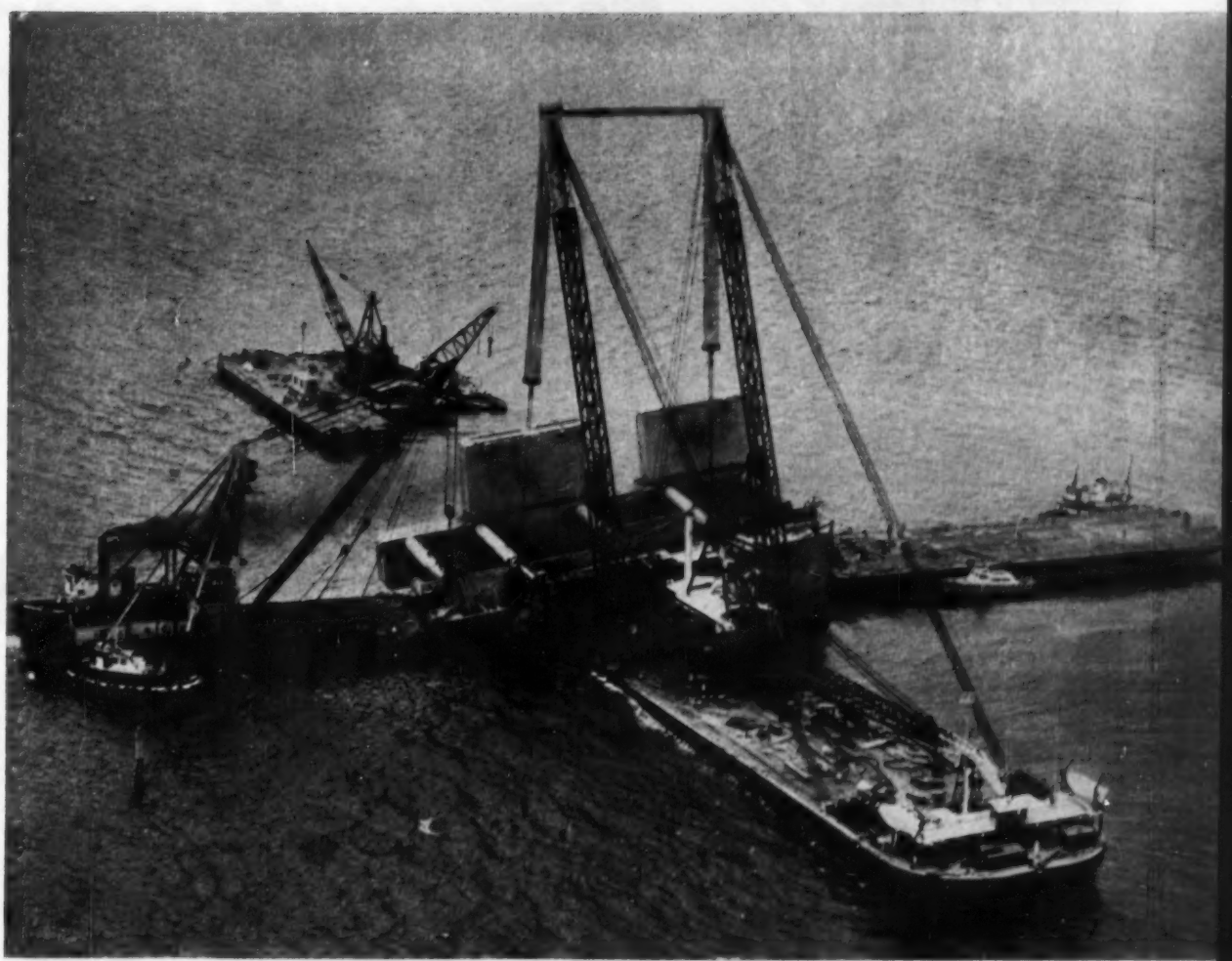
**Most modern comfort and safety features.** New efficiency boosting advances like panoramic windshield, High-Level ventilation, softer seat action and concealed Safety Steps!

**Most modern chassis features.** New suspensions; new, more rigid frames; Power Brakes standard on 2-ton models!

See your Chevrolet dealer for details. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

# NEW CHEVROLET Task-Force TRUCKS

PICTURE OF THE MONTH
CONSTRUCTION METHODS AND EQUIPMENT



# Barge Gets a Lift

GIANT DERRICK rights a 3,000-ton offshore oil drilling barge in the Gulf of Mexico. The barge capsized for unknown reasons.

The salvage job was unusual. Ordinarily, J. Ray McDermott & Co., marine contractors of Harvey, La., use the big sheerleg derrick to set in place massive sections of offshore oil drilling platforms. Superstructures of these platforms are fabricated on shore and barged into position for mounting on the bases, usually anchored with piling driven into the ocean floor.

In tests, the derrick has lifted a record single load of 800 tons. The biggest lifts by the block and fall method run to 400 or 500 tons.

The derrick stands 240 ft high. It is mounted on a barge 300 ft long, 90 ft wide, and 19 ft deep and is supported by cables going to two hoists on the bow of the barge. It is rigged with 9 mi of wire rope. American Hoist & Derrick Co. designed and built the derrick.

HOMELITE

# 5-20

CHAIN SAW

# It's NEW... It's alive with power

5 HP—20 POUNDS

Never before has there been a chain saw with so much power per pound as the new Homelite Model 5-20. It has 5 big horsepower for faster cutting . . . a light, light 20 pounds for easy operation. What's more, it is the only chain saw that gives you a choice of attachments to do many different cutting chores easier.

The new Homelite Model 5-20 is precision built for quick starting, dependable performance, and low, low maintenance. Cuts in any position . . . it saves both time and money . . . brings bigger profits to woodcutting or clearing operations. Write for complete details or see your Homelite dealer.

*See your dealer for details on the Homelite TIME PAYMENT PLAN*

**Packed with power, the new Homelite Model 5-20 Chain Saw brings down big trees six feet in diameter, cuts through 20" trees in 20 seconds without forcing or jamming. Anyone can operate it . . . no experience necessary.**

## DO MORE WITH THESE 5-20 ATTACHMENTS

**Interchangeable Blades** add versatility to the new Homelite 5-20 Chain Saw. For felling, bucking, limbing or plunge cutting, there's a hard track blade for every requirement. Straight blades available from 14" to 60", bow saws 14" and 18".

**Brush Cutter** cleans out brambles, brush, undergrowth and small saplings six times faster than conventional methods. The adjustable harness, hanger and handle bars assure perfect balance . . . make it extremely simple to operate . . . safe for anyone.

**Clearing Attachment** makes quick work of clearing land of small trees. Plunge cuts or plunge bucks . . . no bending or stooping . . . less fatigue. One man keeps three men busy carrying away limbs and piling brush!

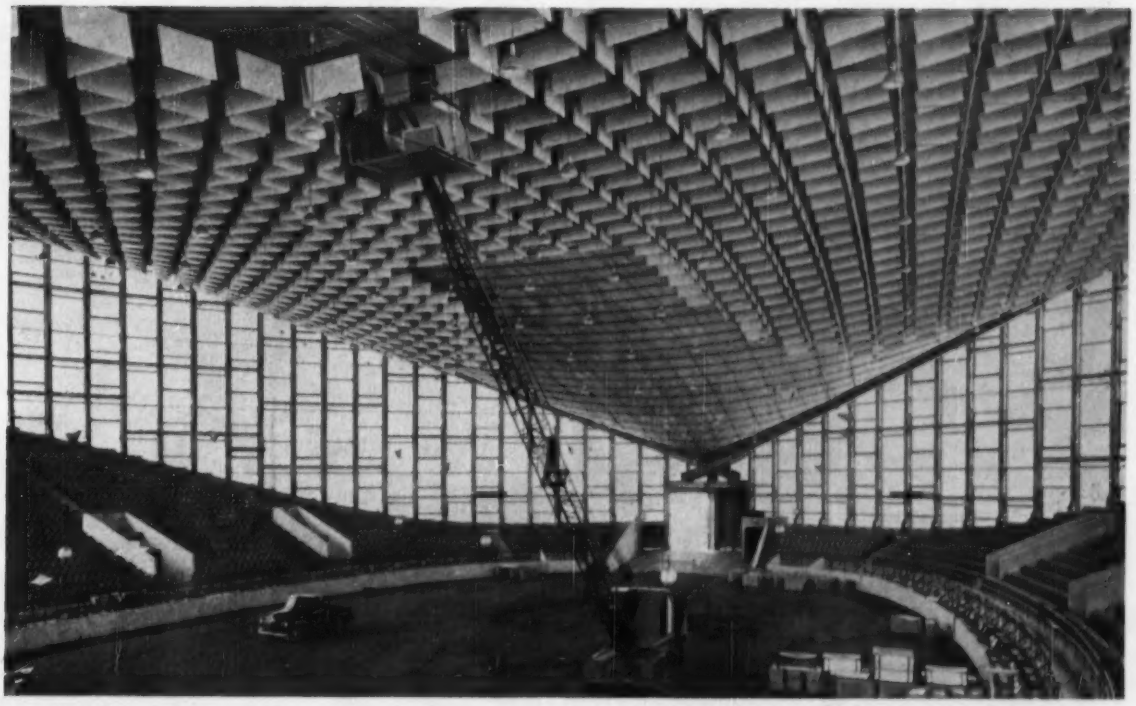
**HOMELITE**

1012 RIVERDALE AVENUE • PORT CHESTER, NEW YORK

*A DIVISION OF TEXTRON AMERICAN INC.*

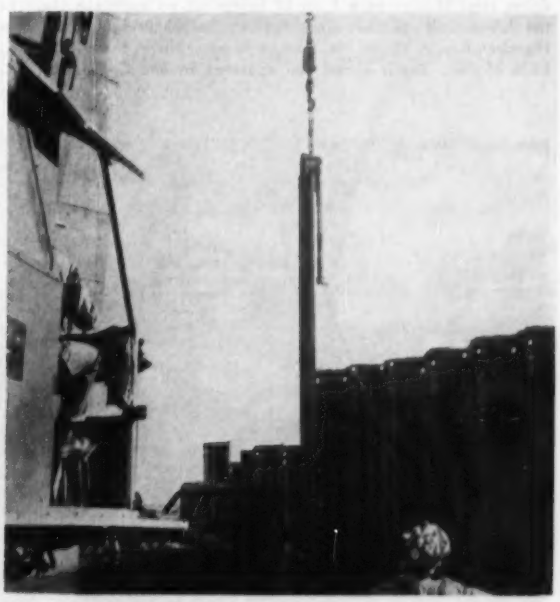
*Manufacturers of Carryable* Chain Saws • Pumps Generators • Blowers

# Construction News in Pictures...



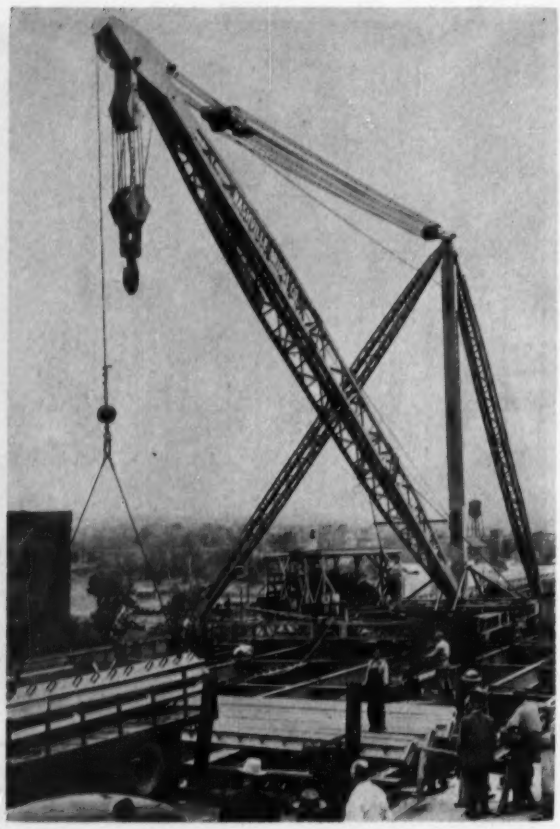
**UP IN THE AIR**—Workmen ride high on a platform attached to the end of a Michigan crane's 90-ft boom. They are hanging acoustical baffles from the ceiling of the North Carolina State Fair Arena at Raleigh. This rig enabled them to hang 3,200 baffles in eight days. Sound bounced off the two-year-old Arena's saddle-shaped roof of corrugated metal to create a serious echo problem. The baffles, manufactured by Owens-Corning Fiberglas Corp., ended the acoustical discord.

**FIGHTING FIRE**—A transit-mix truck of McNall Construction Corp. teams up with a fire department pumper to battle a forest fire at Santa Barbara, Calif. Ralph McNall, son of the owner of the construction company, conceived the idea of using the firm's transit-mix trucks to haul water to the pumpers.



**HAIRPIN ON HIGH**—To toe-in sheetpiling as it is set, Brown & Root, Inc., force it down with a job-built, 2,000-lb hairpin of cold rolled steel. Later a Vulcan No. 1 hammer will drive home the 35 to 40-ft lengths of Foster MP-116 sheeting. The Houston firm is building a power plant addition in Austin, Tex.

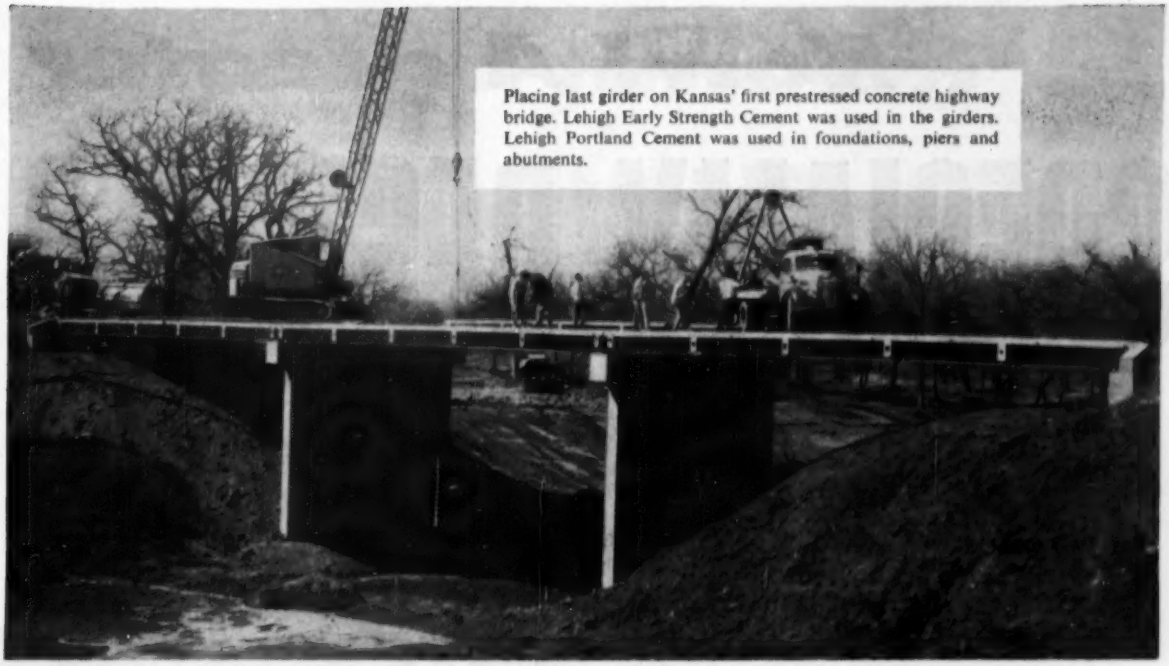
**NEW BAY CROSSING**—Universal pile-driving rig drives steel H-piles on a 3 on 12 batter for an approach ramp to the lower deck of the Richmond-San Rafael Bridge across San Francisco Bay. A Vulcan No. 0 steam hammer drives the 60-ft, 14-in., 89-lb H-piles. Rig is owned and operated by Ben C. Gerwick, Inc.



**BRIDGE BUILDER**—A 54-ton American stiff-leg derrick with 80-ft boom and 46-ft supporting mast places structural steel for bridge over the Cumberland River at Nashville, Tenn. An American three-drum hoist, powered by a GM diesel, operates the derrick. Contractor is Nashville Bridge Co., Nashville.

←

**OUT IN THE OPEN**—Truss members for a $4.8 million hangar at New York's International Airport are bolted-up on crib benches at the site and hoisted into place by cranes. The double cantilever hangar is 133x480 ft and has a 30-ft minimum clearance. The 2,314 tons of steel for its structural frame is joined with 70,000 Russell, Burdsall & Ward high-strength bolts. Lehigh Structural Steel Co., fabricated the steel and is erecting the building.



Placing last girder on Kansas' first prestressed concrete highway bridge. Lehigh Early Strength Cement was used in the girders. Lehigh Portland Cement was used in foundations, piers and abutments.

• One of the 30 prestressed beams being swung into position. Note casting bed in the background. Each beam is 45′ long and 1′ 10″ deep. Width at top is 31¼″, at bottom 10″. Web is 5″ thick.

• Pouring girders at job site casting bed. Tarps cover bed to contain heat from salamanders and protect concrete from *temperatures that averaged 10° above zero.*

Owner—LINCOLN COUNTY, Kansas
General Contractor—ANDERSON CONSTRUCTION CO., Hollon, Kansas
Prestressed girders designed by—KANSAS CITY PRESTRESSING, INC., Kansas City, Missouri

# 75 days saved . . .

## with LEHIGH EARLY STRENGTH CEMENT

The first prestressed concrete highway bridge in Kansas was built last winter, replacing a worn-out structure near Lincoln. To reopen the road as quickly as possible and to keep the high cost of cold weather construction at a minimum, Lehigh Early Strength Cement was used in the prestressed deck girders.

The results! Girders reached post-tensioning strength in ¼ the usual time. Form costs were cut 50%, winter curing costs 30%. The *75 calendar days saved* in casting the girders greatly reduced labor and overhead costs—and permitted earlier reopening of the road.

Try Lehigh Early Strength Cement on your next winter job. It will help you speed operations, cut costs.

LEHIGH EARLY STRENGTH CEMENT
LEHIGH PORTLAND CEMENT
LEHIGH AIR-ENTRAINING CEMENTS
LEHIGH MORTAR CEMENT

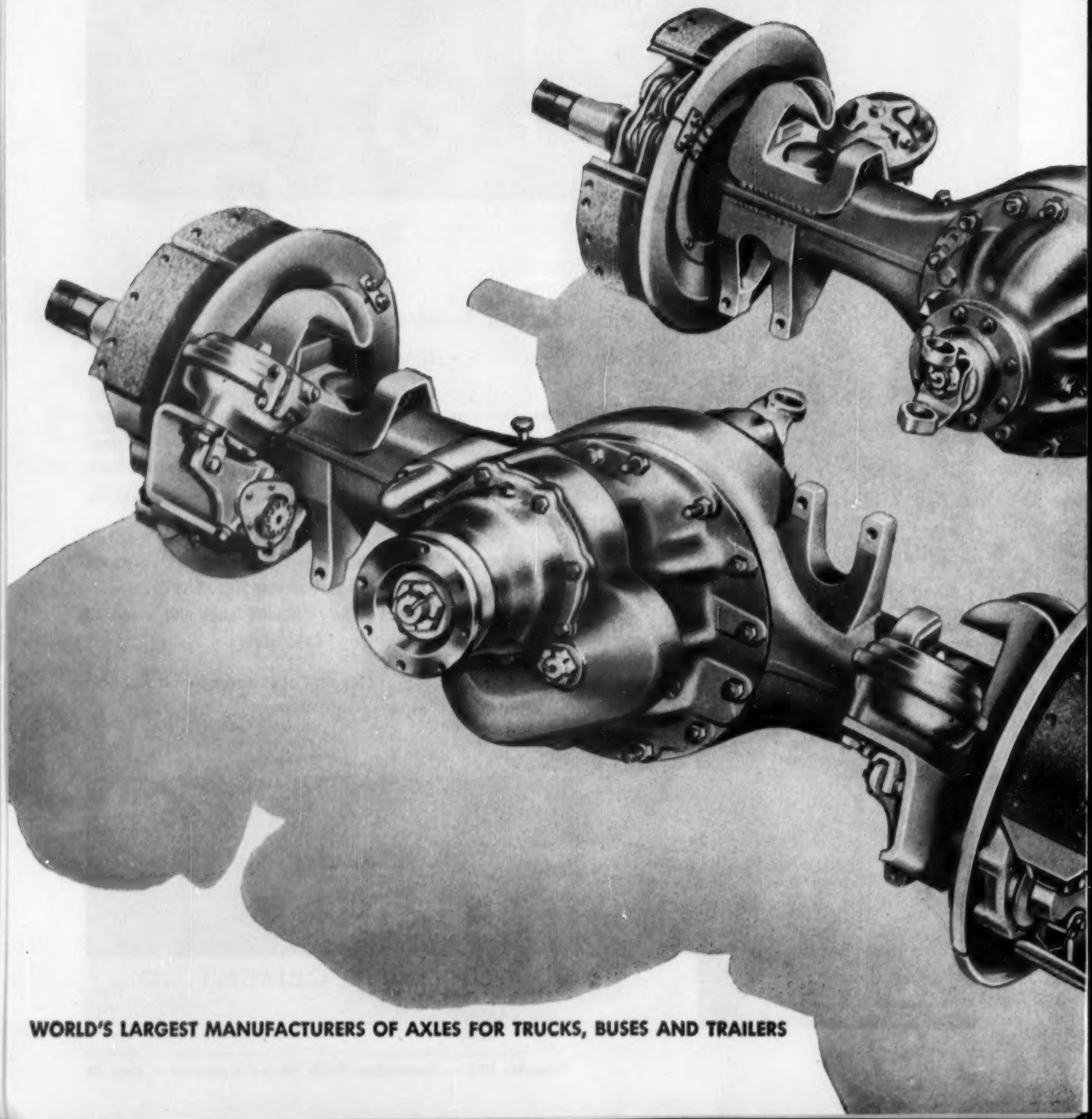
**LEHIGH**

**PORTLAND CEMENT CO.**

*Allentown, Pa.*

## *Now! A greater*

# SPECIALLY DESIGNED



**WORLD'S LARGEST MANUFACTURERS OF AXLES FOR TRUCKS, BUSES AND TRAILERS**

# payload tandem

# FOR HIGHWAY USE!

**Lighter!** The new Timken-Detroit lightweight tandem brings vital new opportunities for savings and profits to all highway truckers because of greater payload.

**Serviceable!** Built almost entirely from interchangeable companion parts used in famous Timken-Detroit single driving axles.

This lightweight tandem has all the features that contribute to profitable highway operation with all unnecessary bulk and weight eliminated. One Timken lightweight tandem unit is more than 200 pounds lighter than any other tandem unit of the same capacity!

Each year highway hauling achieves more spectacular importance. *Now* TDA presents a new lightweight tandem specially designed to answer the needs of over-the-road trucking. It is offered with a choice of either Timken-Detroit axle connecting groups, or brackets to accept other approved chassis hook-up parts. You get all these additional advantages with the Timken lightweight tandem:

**Many proven standard parts and assemblies,** gears, pinions, differentials, brakes used in Timken-Detroit *single axles* are incorporated in the new lightweight tandem. This assures operators fast, economical service with minimum down time.

**A true inter-axle differential** always under drivers' control is an important feature of the Timken-Detroit lightweight highway tandem.

**Big, dependable hypoid gears** rotate in conventional manner, carry load on normal drive side of teeth for increased gear and bearing life.

**Torture-tested TDA axle shafts** are upset forged and heat treated to insure top tensile strength.

**Rugged hot-forged housings**—pound for pound—are the strongest and most rigid built.

**Less unsprung weight** means lower impact and shock loads, for longer truck and trailer life.

This new highway tandem insures new payload profits, faster, easier service and operating economies for highway truckers everywhere. For complete information contact your nearest vehicle dealer or branch.

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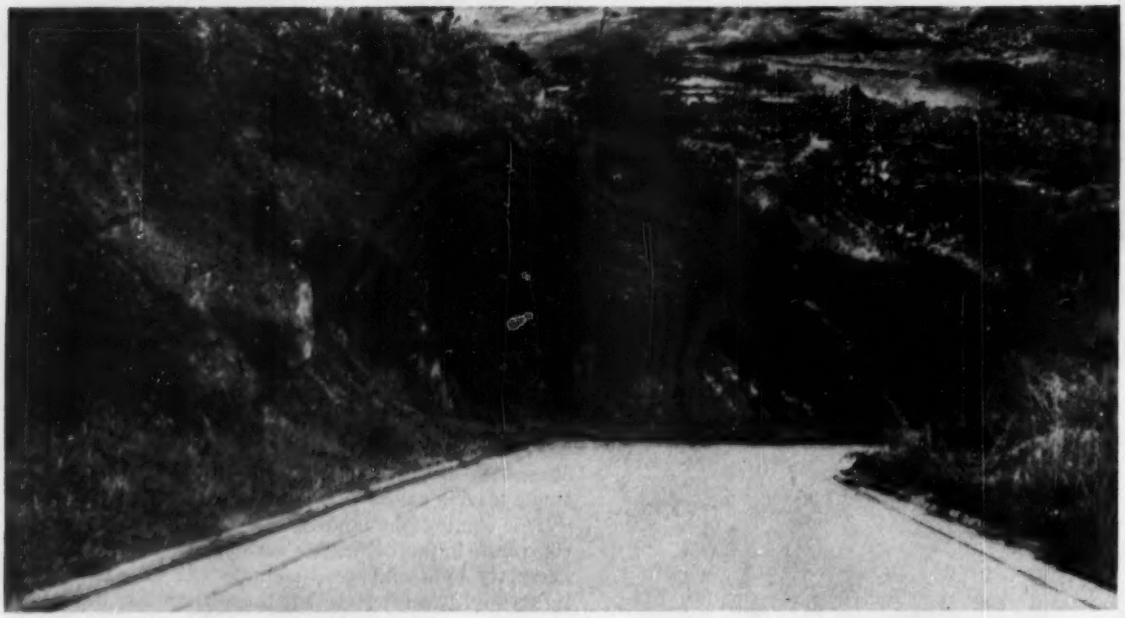
Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

# CONSTRUCTION 'ROUND THE WORLD



## Nice New Road . . .

RESIDENTS OF THE NORTHERN SUBURBS of Rio de Janeiro could drive into town in only 20 min over the new Grajau-Jacaropagua highway. The road was opened to traffic before all work was completed because funds for the project ran out. Unfinished work included slope protection. National Highway Department engineers had planned to stair-step the steep, narrow cuts back from the road, but only a few of the stair-steps were completed. The slopes of even the steepest cuts were not shored when work was stopped.

## . . . Buried by Slide

THEN THE RAINS CAME, and one of the unprotected slopes crumbled, hurling thousands of tons of earth and rock on to the road. Cleaning up and new construction to put the road back into service will cost an estimated $157,000 and require about 15 months. Engineers plan to cut back the steep slopes to an easier grade and install a series of drains along the cuts. In the meantime, suburbanites who want to drive into Rio de Janeiro must spend more than an hour driving around the blocked road into the city.

# Contractor uses three

# ADAMS "660s"

## to speed tough grading jobs on Ohio Turnpike...

• The Cook Construction Company of Jackson, Miss., is building a 12-mile stretch of the Ohio Turnpike, near North Royalton. For the tougher grading operations on this job they are using three of their 140 hp. Adams "660" Motor Graders.

Commenting on the performance of the "660," Cook Company operator, James Smith, says, "This machine will do everything any grader will do and a lot more. It has more weight and power and higher speeds, both forward and reverse."

Another Cook Company operator, Robert Ault, says, "The '660' is the best machine I have ever operated. It has the power, weight and speed to handle toughest jobs—even grading in rock where it is actually shovel work."

You'll find the Adams "660" capable of doing up to 30% more work than any grader you have ever used. Ask for complete information on this great machine—today!

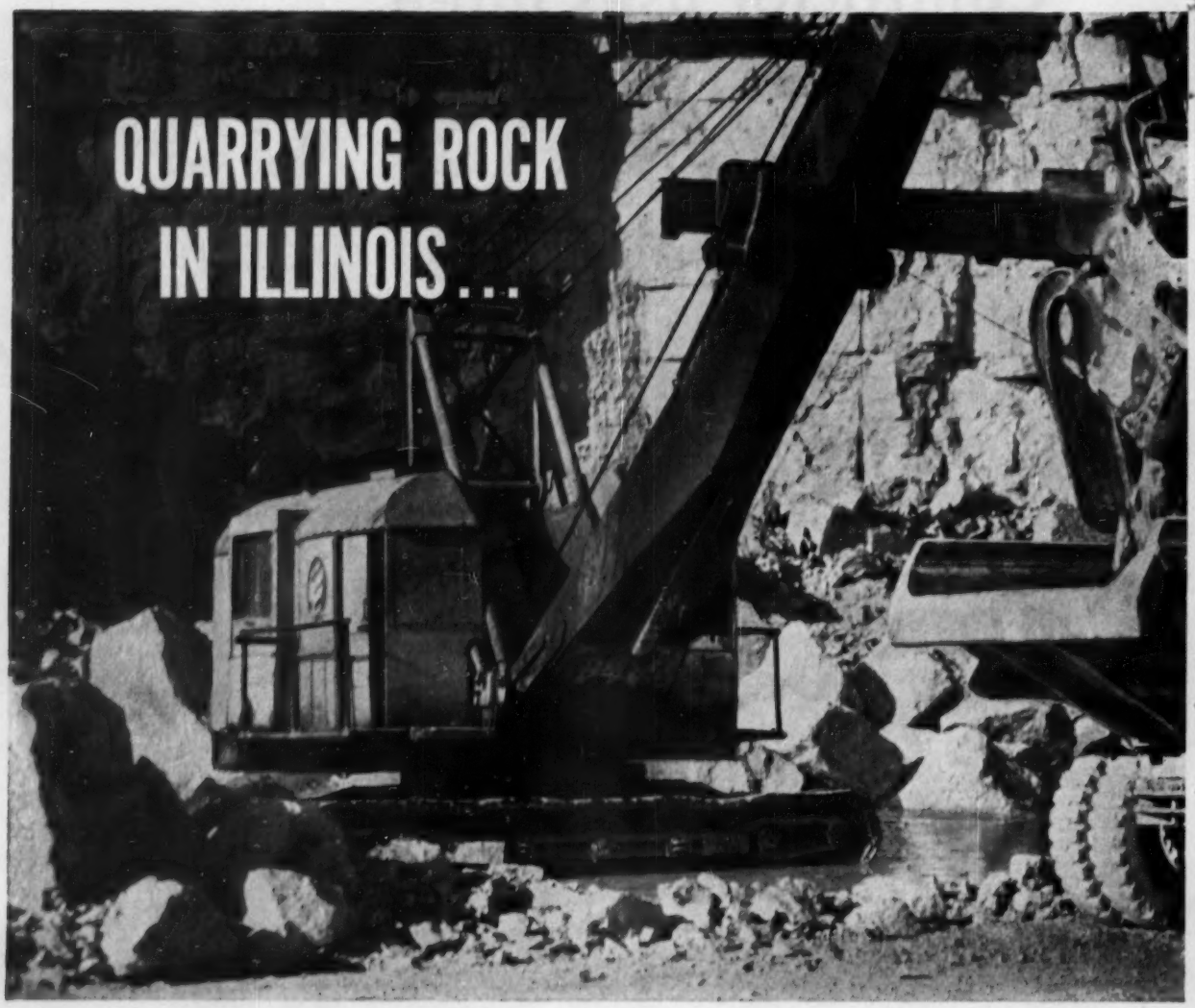
*A Product of Adams Division*

**LeTourneau-WESTINGHOUSE Company, Peoria, Illinois**

*Subsidiary of Westinghouse Air Brake Company*

ADAMS

Motor Graders TraveLoaders Pull-Type Graders




# "NYLON CORDS HAVE ELIMINATED

## says GLENN BENEDICT,

**Master Mechanic, Consumers Company, Chicago, Illinois**

"Rock-quarry service calls for tires that can take it. For one thing, the trucks are springless. This means the tires take all the flexing when the trucks are loaded. And then there's the trip to the crusher, lugging 15-ton payloads over rough quarry bottom and unsurfaced roads. Our trucks roll 8 hours a day, 6 days a week, averaging 7 trips to the crusher an hour. Tires really take a beating. We used to have a lot of trouble.

### More Hours of Service

"Then in 1950 we started using nylon cord tires. Now we've got a 95% nylon cord quarry fleet, and soon hope to make it 100%. We've found nylon cords

**YOU'LL FIND NYLON IN PASSENGER-CAR TIRES, TOO! Impact-absorbing nylon cords mean extra protection against blowouts . . . greater safety on any road.**

# BRUISE BREAKS IN OUR OPERATION"

are just the thing for rugged quarry duty. They've completely eliminated bruise breaks—a big safety factor on dangerous quarry roads. No more moisture deterioration, either. Even when water gets in through rock cuts, it doesn't hurt nylon. Best of all, we're getting 3,000 to 5,000 hours of service from our nylon cord tires—a 10-15% gain over ordinary tires."

### Lower Cost per Mile

Actual road experience proves nylon offers extra protection against tire failure. Truck users' reports show nylon cord tires mean fewer road delays, more mileage, more retreads—lower cost per mile.

Prove to yourself that nylon cord truck tires give substantially lower cost per mile. Ask your dealer about nylon cord truck tires today. (Du Pont makes the tough nylon yarns, does not produce tires.)

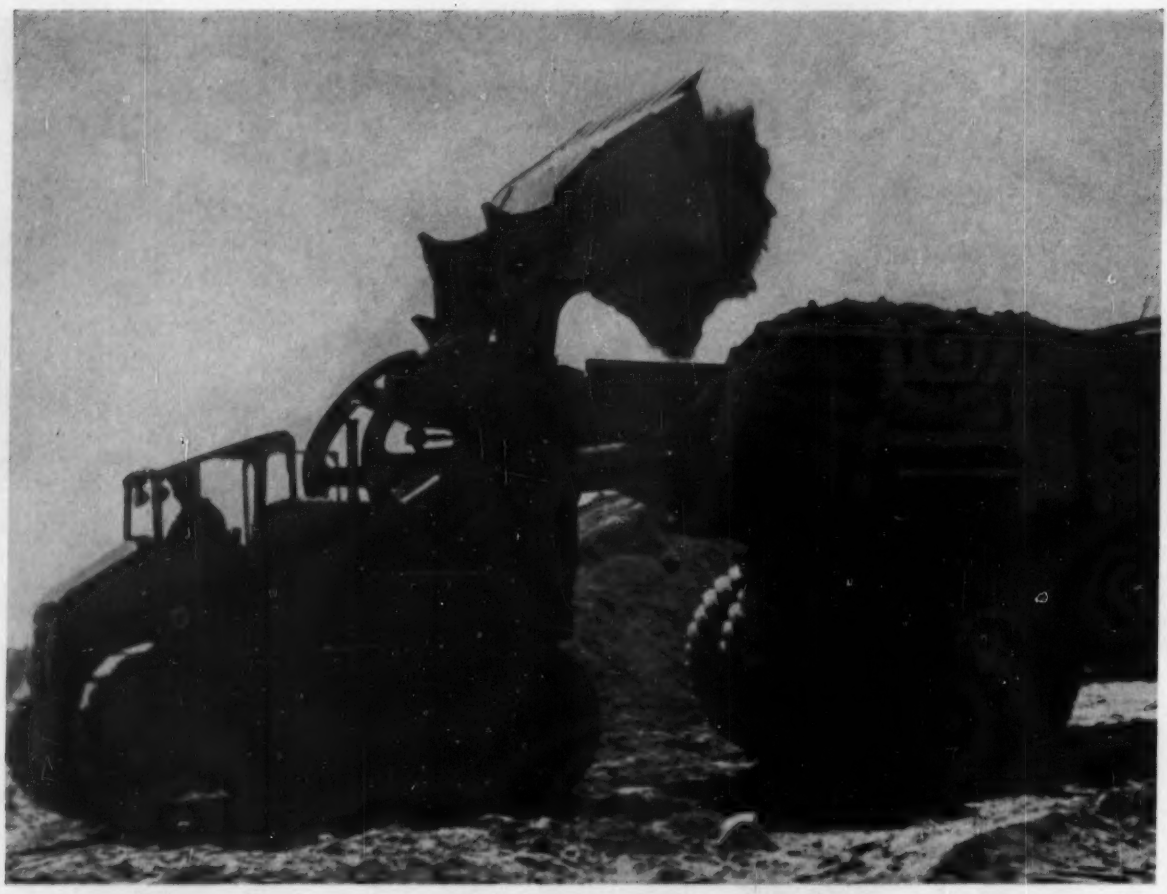
**DU PONT NYLON FOR TIRE CORD**

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
*. . . THROUGH CHEMISTRY*

**FREE BOOKLET on nylon tires—write for your copy. Textile Fibers Dept., Room 2494, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.**



# EIMCO 105 LOADS 15 YARDS IN 3 MINUTES

**Eimco 105 Tractor-Excavator loads this heavy-duty truck with 15 yards of heavy, compacted mine dump material at an average rate of 3 minutes, including travel time, or 2700 tons per shift.**

**Trail cutting with an Eimco Tractor in primitive area. Tests show this to be the fastest machine for this work.**

**The 105 loads from the end of the truck or from the sides depending on the truck driver's approach to the loading point. On this job, 6 of these trucks are kept busy on the short run and each of the trucks cost more than the efficient Eimco Tractor-Loader that keeps them loaded.**

**Eimco 105 Tractors equipped with Bulldozers will do more work with less operator effort than any other crawler tractor equipment of their size class or even slightly larger equipment.**

**When compared with traditional excavating equipment such as power or boom type shovels, Eimco's highly mobile tractor, equipped with the digging and overhead loading attachment shown above, will out-perform these heavy cumbersome boom type units costing two or three times as much.**

**Investigate the Eimco Tractor. Hundreds of users of this heavy-duty machine say it is the most dependable unit on their job.**

**THE EIMCO CORPORATION**

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

DECEMBER, 1955 • VOLUME 37 • NUMBER 12

HENRY T. PEREZ, Editor

CONSTRUCTION METHODS AND EQUIPMENT

# Merry Christmas

AS YULETIDE APPROACHES, the ties that bind the construction fraternity together quicken with the special warmth and friendship that go with Christmas. And it gives each of us another chance to salute an industry whose job it is to change the face of the earth for the benefit of mankind. To all members of that fine and far-flung construction team at home and abroad, the entire staff of Construction Methods and Equipment sends greetings and all best wishes for the merriest of Christmases.

# And a Happy New Year

WHAT WILL THE NEW YEAR BRING for construction? Plenty of progress and plenty of headaches, for construction is an industry constantly on the move.

Volume-wise, 1956 should be another record-breaker in all fields except possibly private housing. Roadbuilding will hit a new high, with Congress passing some form of an expanded highway construction program.

On the equipment front, prices will be higher and machines generally harder to get. Mergers and consolidations of manufacturers will go on, continuing to cause dealer realignment as product lines are shuffled or expanded.

As for the machines themselves, size and power and speed will be increased to reduce unit production costs. Conversely, smaller equipment will be introduced to mechanize operations now handled manually. Some machines will be more specialized, designed for one type of work only. Others will become more versatile, to handle a greater variety of jobs.

While the new machines will make more money for the contractor—albeit increasing his financing problems—perhaps the operator will benefit most. More of his controls will be operated by electricity, hydraulics, air or vacuum to reduce fatigue. Increased installations of such things as power brakes and steering, automatic clutches and torque converters will help ease his job. Advances in seating comfort, improved visibility, and more safety devices are all in the works.

As with construction equipment, materials will cost more and some will be in short supply. Steel and cement head the list. But expansion of production, new substitute materials and advances in construction methods will help relieve the situation.

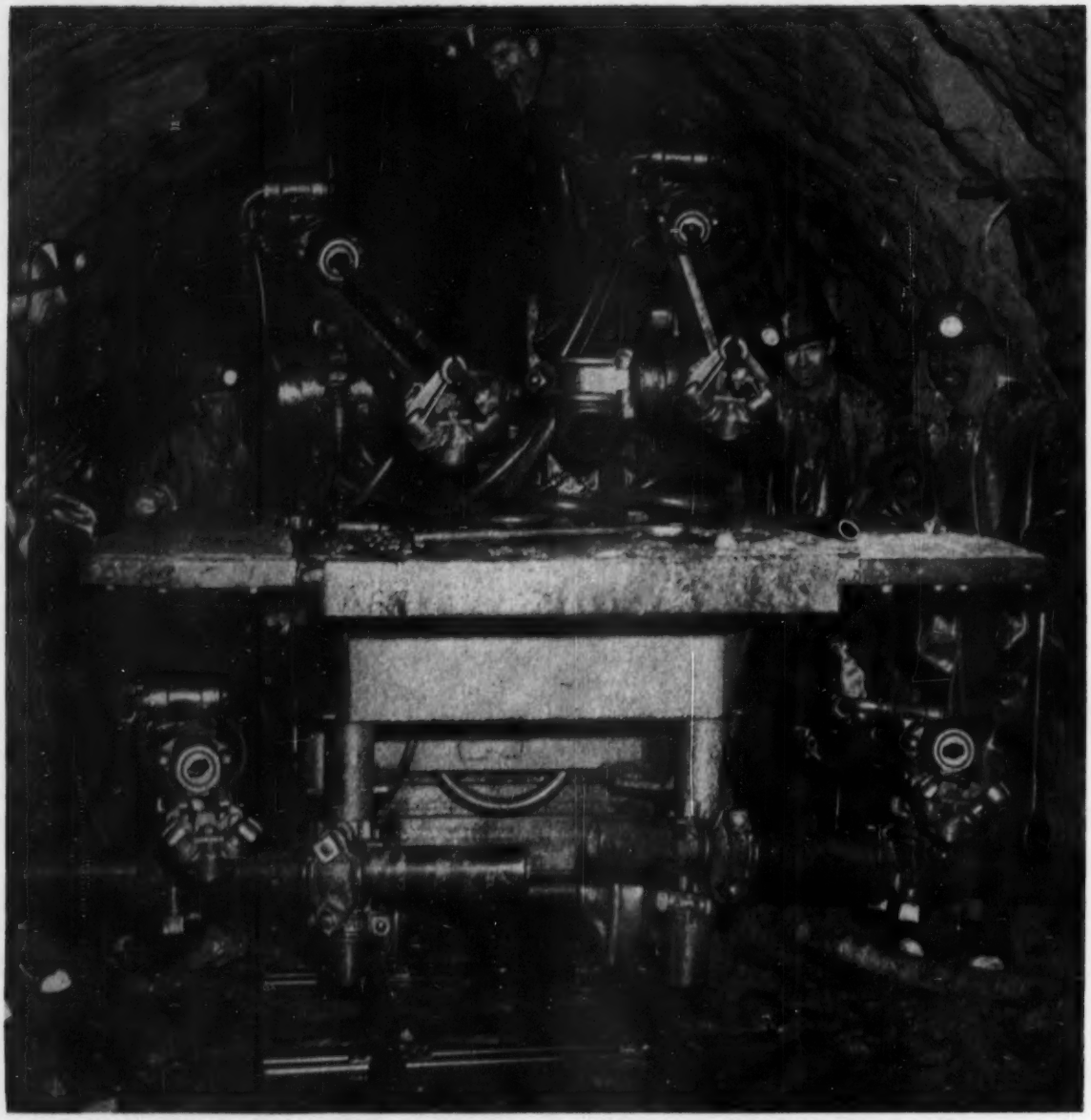
On the labor scene, rates will go up and fringe benefits increase. A merged AFL-CIO is no guarantee of jurisdictional peace, of course. And it may well mean a more intense drive to organize non-union jobs, along with a continuation of the attempt to bring contractors' field engineering forces under union control.

Money for contractor financing will carry a higher price tag too, yet few prudent contracting ventures will die a-borning for lack of backers. As usual, however, too many unsound construction gambles will be launched with the help of reckless lenders.

Contractor competition on all types of projects will remain keen. But bidding generally will be less cut-throat, and bid prices more realistic.

Contractor ingenuity will continue to surmount problems posed both by nature and by man, to bring even the toughest jobs to completion. And, as many restrictive provisions are chipped away from antiquated building codes, construction will become even more efficient. New construction methods, pioneered by an alert and growing industry, will continue to help us build better, safer, faster and more economically.

So it all adds up to another exciting construction year. Let's get on with it!



DRILL JUMBO mounting four Ingersoll-Rand drifters is pushed to tunnel face and then braced against walls with rods. After drilling, platform sides fold down, bottom drills fold back, and jumbo is pulled away. Crews work two headings, average 2½ rounds per shift in each heading. No lights are strung along tunnel. Each man carries removable head lamp made by Mine Safety Appliance Co.

# Tunnel Job: A Smooth Operation

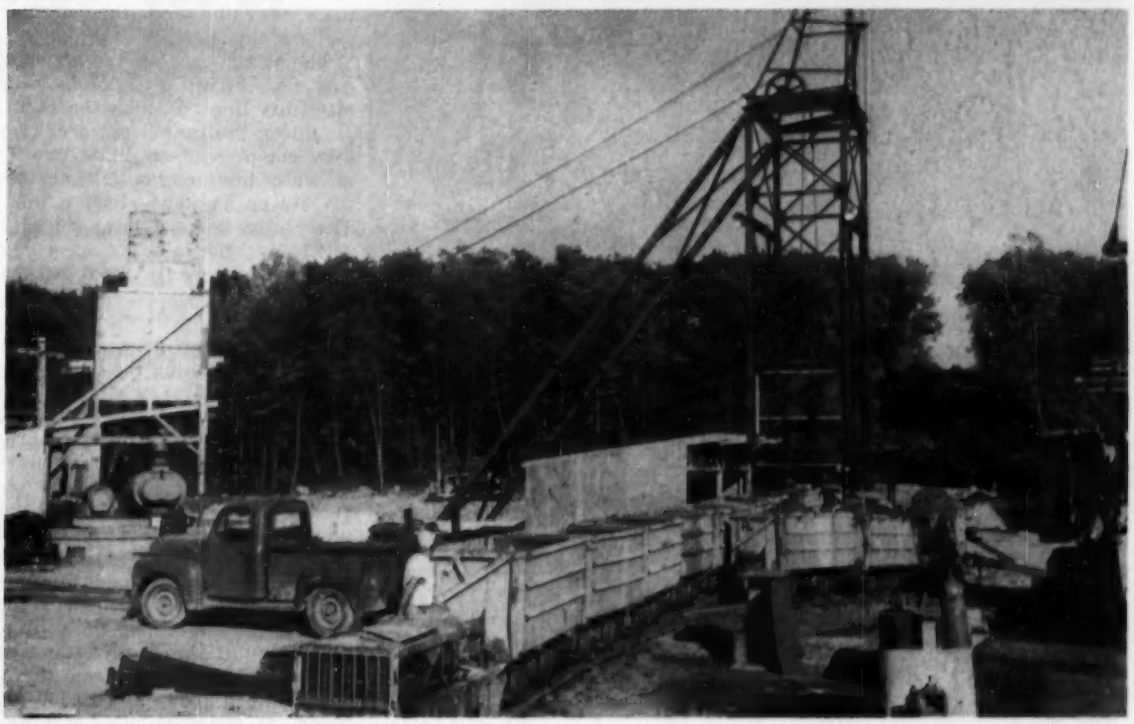
HARD GRANITE is no match for drillers on a big water tunnel job near New Haven, Conn. Crews of joint-venture contractors Coker-Kiewit average 2½ rounds per shift in each of two 9-ft dia headings. They work round-the-clock, and tunnel better than 85 ft a day.

It's a smooth operation. As soon as a shot is mucked out the shift boss lays out a 36-hole pattern on the rock face with a paint stick. The rest of the crew lays new track. When the track is in, a jumbo is pushed closed to the face by a Plymouth diesel locomotive. The jumbo mounts two Ingersoll-Rand drills on top of a platform and two below. Top drills are controlled by air-powered jibs, and bottom drills are attached to columns. The jumbo carries a small air receiver under the rear of the platform. Bethlehem drill steel is tipped with carbide-type Rok-Bits.

Air and water lines are coupled to the jumbo, and the drills begin to cut through the hard rock. Holes are drilled 7 ft deep. The pattern is a conventional pyramid type with 0 through 8 delays. When the holes are wired, the jumbo is pulled back several hundred feet

CONWAY MUCKER lifts bucket and dumps shattered rock overhead onto belt conveyor which carries it to muck car.

CAR PASSER shifts empty muck car to main track where it will be pushed by diesel locomotive to mucker for loading.



STEEL HEADFRAME set up over 160-ft deep shaft lowers train of empty muck cars one at a time on hoist. Loaded cars wait on siding to be pulled to spoil area and dumped. Shaft is close to center and at low point of 4-mi tunnel near New Haven, Conn. To relieve work of main elevator, small material elevator is operated in space between guides of main elevator and walls of shaft.

and parked on a turn out. The shot is then fired, pulling about 6½ ft. Dynamite factor is 8 lb of 60% Gelamite per yd of rock.

Dust and fumes are drawn out immediately through a 14-in. pipe connected above ground to a Sutorbuilt 75-hp reversible blower. There is a blower for each heading. They each have a capacity of 5,000 ft per min. In a few minutes the contaminated air is removed, the blowers reverse, and the crew returns to muck.

Key unit in the mucking operation is a Conway 50B mucker. The electrically powered rig has an overhead-type bucket in front which dumps onto a car-loading belt conveyor in back.

### Car Handling

Mucking is speeded by fast car handling. The muck train generally consists of eight cars and the locomotive. It is assembled at the bottom of a 160-ft deep shaft near the center of the 4-mi tunnel.

The train leaves the shaft, picks up the mucker at a turn out, couples it in front, and continues on to the heading. Here, it leaves the mucker and one car coupled together at the muck pile as the last car in the train is pulled over on a passer. When the first muck car is loaded, the train moves up, couples to it, and then moves back past the car passer. The empty car on the passer is then pushed back on the main track so that the train can push it up to the mucker. Before the train moves back, the last empty car is pulled over on the passer. The procedure is repeated until all muck is removed. It usually requires eight cars.

The loaded train is then pulled

# Good Handling Of Small Details Speeds Tunnel

PLYMOUTH LOCOMOTIVE, powered by diesel engine with exhaust scrubber, is fast and maneuverable. Fuller torque converter provides smooth operation. Maintenance costs are low.

STEEL TIES for narrow-gage track are laid quickly at tunnel face. No spikes are required. Workmen simply hammer clamps over flange of rail. Clamps never work loose. Short lengths of rail at face are replaced later with 30-ft sections.

PROJECT ENGINEER, Louis Avery, shines light from headlamp on Scotchlite band at base of line and grade marker. By sighting on two reflectorized bands, foreman can lay out axis of tunnel on face of heading. Candles normally burned in marker often blow out.



to the shaft, and the cars are taken up one at a time. To prevent any slipping, a hand-operated latch anchors the car to the platform. On top, the cars are pulled by a gasoline-powered locomotive to a spoil area where they are dumped.

The only entrance to the tunnel is through the 13-ft dia shaft. An elevator is operated inside by a 200-hp electric Vulcan - Denver hoist housed in a building about 100 ft from a steel headframe. To relieve the work of the shaft elevator, a small material elevator operated by a Joy 35-hp electric hoist operates in the space between the main elevator and the circular walls of the shaft.

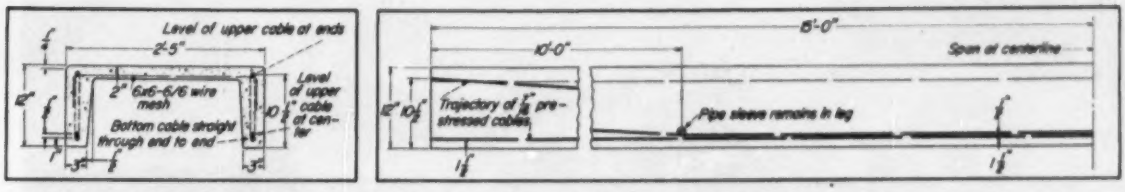
The same space on the opposite side of the main elevator handles all utility lines. Besides the 14-in. air ducts, the tunnel requires two 6-in. compressed-air lines, two 2-in. water lines, and outlet lines for two 50-hp Pomona shaft pumps. The pumps have a total capacity of 1,200 gal per min, but are called upon to remove only about 240,000 gal per day.

### Drilling Water

Water for cooling the drills presented a problem when the job started. Because it also was used for drinking, water had to be purified. This was an expensive procedure until the contractor discovered a new source. While drilling a vertical bore hole down to the tunnel, he hit a stratum of very pure water. He plugged it up temporarily and then completed the bore. Later he tapped the source, and piped it down to a tank at the base of the shaft. From there, it is pumped above to a 10,000-gal standpipe and distributed at a constant pressure.

Another important utility is compressed air for operating drill jumbos in both headings. The required 2,200 cfm is supplied by two Joy-Sullivan compressors.

Work was started early this year, and the job is expected to be completed next summer. The project is an important link in a proposed system of the New Haven Water Company. The $2.8 million tunnel contract is a joint venture of Coker Construction Co. and Peter Kiewit Sons' Co. W. H. Nixon is project manager and L. Avery is project engineer for the contractors. Resident engineer for Malcolm Pirnie Engineers is A. W. Douglas, who also represents the New Haven Water Co.




**ROTATING PIPE SLEEVE** bends pre-tensioning cable at proper point. Bent cables not only induce compressive stress in the top fibers over the supports, which eliminates reinforcing, but also reduce the possibility of the cable slipping in the concrete.

# Pre-Tensioning Costs Cut by Bending Cables

BENDING PRETENSIONED CABLES on a prestressed concrete job in Georgia cut material costs nearly 7%. Albany Concrete Products Co. of Albany, Ga. developed the system to mass produce precast, channel-shaped treads and risers for a stadium in Cartersville, Ga. They did it by feeding cables over and under rotating pipe sleeves placed over pins that spanned the walls of steel forms. Compared to a conventional pretensioning system, the method eliminated one cable and 10 ft of reinforcing steel from each unit.

Bent cables are preferred in prestressing because they induce a compressive stress in the top fibers over the supports, eliminating reinforcing. They are common in post-tensioned work because the operation is simple; the cable is fed through a parabolic core cast into the member.

But pretensioned cables have been difficult to bend until now. They usually were tensioned in a straight-through manner and then forced downward at the desired points with pushrod and jack. And the pushrod had to be left in the concrete.

Another method consisted of passing the cable over and under pins. This presented problems because the pin and cable would bind, causing unequal stresses.

Albany's solution is a ¾x3-in. black iron pipe and a ¾x6-in. machine bolt for the pin. The bolt simply passes through holes in the sides of steel forms. A little oil or grease on the surface of the bolt permits the sleeve to rotate freely.

**PRE-TENSIONING CABLE** bends over and under pipe sleeves inside steel forms for concrete channel-shaped stadium units. Use of this method cut material costs nearly 7%.

A clearance of 1/16 in. provides a smooth-operating pin-and-sleeve combination. Expandable steel forms of 3/16-in. steel are attached to 7-in. channels anchored to a concrete bed. They are designed to resist vertical thrusts of 2,000 lb.

This pin and sleeve combination make it possible to tension up cables for seven units at a time in only 30 min. The upper slack cables are hauled by overhead crane from the jacking end to the anchoring end. Then, the bottom cable is pulled through under shoulder plates. When pins and sleeves are inserted, hydraulic jacks tension the cables. There is no evidence of frictional binding anywhere. Concrete with an 18-hr strength of 3,500 lb is poured over the cables and steam-cured. When the cables are ready to be cut, the pins are pried out, and the sleeves are left in place. Pins may be used several times.

## Toggles Replace Bolts on Dredge-Well Domes

DREDGE-WELL DOMES bolted above the cutting edges proved just a good way to help sink caissons on Virginia's new Rappahannock River Bridge. (CM&E, Sept., 1955 p 50). But when the domes had to be removed, divers spent a lot of time unscrewing the 134 bolts around each dome. So Diamond Construction Co. called in Mayo Tunnel & Mine Equipment Co. to improve the system. Mayo replaced the bolts with a ring of 16 toggle jacks that could be tripped from the surface by a line to a Whirley. The bottom end of each toggle is welded to the dome, and the top end fits into a recess in the wall of the dredge well. When the domes have served their purpose, the toggles are tripped, and the domes lifted out.

SCRAPER LOADS big chunks of rock left by ripper in rough cut. Two-wheeled tractor unit, with full weight on the drive wheels, has good traction where the going is rough. Here it pulls Wooldridge Terra Cobra scraper with 18-cu yd capacity.

FOUR-WHEELED TRACTOR PULLS Wooldridge scraper on smaller size rock. This unit has less clearance but easier steering and greater roadability for long hauls than the two-wheeled tractor. Both are powered by 225-hp Cummins diesel engines.

# Scrapers Pass Tough Loading, Hauling Tests

A FLEET OF SCRAPERS is getting a heavy workout on U.S. 101 half-way between San Francisco and Los Angeles. Madonna Construction Co. of San Luis Obispo, Calif., is using scrapers alone to move 1,702,000 cu yd of excavation, much of it compacted shale.

Most contractors would rely heavily on shovel and truck operations in this Atascadero Freeway job. Even with extensive ripping, the shale breaks into large size rock. And because all the material goes into fills, lots of hauling is required.

Some material must be hauled as much as 3 mi. Total overhaul is 18,700,000 station yards; freehaul is 500 ft. This imposes a severe test of both the loading abilities and the hauling qualities of Madonna's two dozen Wooldridge scrapers. So far they are passing the test with flying colors.

RIPPER BREAKS UP compacted shale ahead of scrapers. Skill in handling rippers permits scrapers to operate more swiftly, efficiently. Caterpillar D8 tractor hauls Wooldridge ripper; it also handles all push-cat work on the 9-mi grading job.

GRADER SMOOTHS fill and tank truck sprinkles area to help compaction. Some super-fills have a surcharge of up to 5 ft which must be left in place as long as 5 months to settle the underlying soil. These super-fills were first-order work.

Some of the units are latest model 25-cu yd open bowl Terra Cobras. Others are not quite so new. Still others are fairly old 18-cu yd units. All the newer units have tractors powered by 225-hp Cummins diesel engines. These units have 10 speeds and will travel better than 30 mph over the well maintained haul roads on the job.

Madonna's bid of $2,965,000 for the job—including structures and paving as well as grading—was $270,000 below the next low bid. For the roadway excavation, Madonna bid 27c per cu yd compared with a next low bid of 29c per cu yd. But three bidders were lower than Madonna's $0.003 per station yard for the overhaul.

Tight bidding and a contract provision allowing only 270 working days for completion of all the work made efficient organization of the job a *must*. Results speak for themselves: In the first four months on the job, Madonna scrapers moved 1,000,000 cu yd of material. Best month's record was close to 400,000 cu yd. Top production for one working day was 23,000 cu yd on a one-shift operation.

Some of the excavated material goes into super-fills that have a 4 to 5-ft surcharge. These fills were first-order work because the surcharge must be left in place from two to five months to settle the underlying soil. Bulldozers and graders keep the fill areas smooth so that the scrapers may move over the fill to help compaction.

California requires 90% relative density increasing to 95% in the top 2 ft, so extensive rolling also is required. A Buffalo-Springfield Kompactor has proved an effective rolling unit. It looks like an ordinary steel-wheeled roller with slots cut in the

EQUIPMENT ROLLS over fill area to aid compaction. California requires 90% relative density, increasing to 95% in the top 2 ft. Terra Cobra scrapers travel at better than 30 mph speeds over the well-maintained haul roads on the job.

wheels, but it is self-propelled and has greater maneuverability than sheepsfoot or rubber-tired rollers that are hauled by tractors.

Proper loading conditions are of primary importance to the success of the job. Caterpillar D8 tractors, hauling Wooldridge rippers, break down the material in the rocky cuts by extensive ripping. Then, Madonna carefully evaluates each cut to determine the slope for best loading. Some material will load better with the scrapers operating nearly level. Other material loads best when the scrapers are running slightly downhill.

Scraper operations on the 9-mi job are split into three spreads, Each spread has from 4 to 12 units, depending on the available working room, the yardage to be moved, and the length of the haul. The spreads are carefully balanced.

Madonna puts more value on operator time than on equipment rental cost. Extra scrapers are held in a standby capacity so that when a scraper is down for servicing or repair, the operator can continue work with a standby unit.

There are no job offices or shops. All Madonna superintendents and foremen work out of pickup trucks. Mechanics have relatively complete repair equipment in their trucks, and equipment is repaired on the grade where it breaks down.

Madonna Construction Co. has some $10 million in highway contracts in the central California coastal area, but Alex Madonna, head of the firm, spends enough time on this job to completely control the work. The Atascadero Freeway is a project of the California Division of Highways, G. T. McCoy state highway engineer. The work is under the direction of E. J. L. Peterson, district engineer. Resident engineer is G. D. Gardner.

ROLLER MOST USED is Buffalo-Springfield Kompactor. Because it is self-propelled, this unit has the advantage of greater maneuverability than rollers hauled by tractors.

TRUCKS CONTAIN repair equipment sufficient to handle most break-downs where they occur. Extra scrapers are kept available for use when a unit is down for repair.

# Film Teaches Safety in Roadbuilding

COULD THESE ACCIDENTS happen on your highway job? They might, unless you exercise extreme vigilance and take all possible safety precautions.

To help you with this problem of roadbuilding safety, Caterpillar Tractor Co. has released "The Last Mile," a 20-min color film from which the accompanying photos were taken. The film demonstrates such things as correct flagman practice, proper type and location of barriers and warning signs, the right way to load equipment for transport, safe operation of roadbuilding machines. And it dramatically portrays the tragic consequences—to passing motorists and construction workers alike—if these safe practices are ignored.

The film's narrator says, describing the opening scene in which a condemned criminal is walking his "last mile" to the death chamber, "This man is going to die. And if it's any consolation, he knows how, he knows why, and he knows when." The prisoner has no other choice. But your workmen do not need to be killed. This film will help keep them alive.

Cooperating with Caterpillar in producing "The Last Mile" were the Construction Section of the National Safety Council and AGC.

IMPROPER EQUIPMENT LOADING causes spectacular accident in "The Last Mile." Lesson: Mount machine square and on center of trailer, affix red clearance flags on projections.

OBSCURED WARNING SIGN is no help to motorist barreling down highway, so he crashes into parked tractor. Lesson: Put up adequate signs, see that they are well maintained.

LACK OF SIGNS causes driver to encounter contractor's grader and sprinkler truck unexpectedly, and he flips off the road into the field. Lesson: Make sure warning and speed-reduction signs are posted and that they are moved up as project advances.

**INCREASED PRODUCTION** results from use of tubular sectional scaffolding in demolition of 12-story building on New York's Park Avenue. Contractor expects to cut 25 days off estimated 165-day demolition time because of switch from hanging scaffolds.

# Rigid Scaffolding Speeds Production

STATIONARY SECTIONAL SCAFFOLDING is speeding demolition of a 12-story apartment building on New York's Park Avenue.

It was more costly to erect than suspended scaffolds. But its use is resulting in increased production which is expected to cut total demolition time 15%. This saving, according to the contractor, will more than make up for the higher erection cost.

The building, which measures 200x185 ft, is being torn down by Lipsett, Inc., to make way for the new $20 million, 38-story Seagrams Building. Lipsett is subcontractor for George A. Fuller Co., who will erect the building.

Lipsett turned to rigid scaffolding to attract labor. The demolition job is a big one, and men willing to work on suspended scaffolds are becoming scarce. Rigid scaffolding is safer, and men who would not go near hanging scaffolds will work on it. Because they work with confidence, they work faster. Lipsett expects to cut 25 days off the estimated 165-day demolition time.

Lipsett's first experience with stationary scaffolding was during demolition of Center Theater in New York a year ago. Because of the building's auditorium-like design, it had self-supporting walls to eliminate any need for interior columns and beams.

There were no cross members to secure outriggers necessary for supporting hanging scaffolds. Lip-

SIDEWALL BRACKETS for scaffold planks permit men to work close to building. This increases their confidence. As a result, they work faster and production is stepped up.

Cross pieces connecting the tubes inside the window prevent the scaffolding from falling outward. Braces between scaffolding and building prevent inward motion.

Sidewall brackets fastened to the inner face of the frames provide seats for two widths of scaffolding planks. These come close to the building permitting men to work in safety close to the building's walls. Guard rails secured to the outer face of the frames and covered with wire mesh are another safety feature.

Lipsett breaks first one half of the floor being worked on and, while scaffolding for this floor is being removed, breaks up the adjacent half.

Hand and jack hammers break up the masonry and concrete slabs, exposing the structural steel. Rubble is moved from the floor below by three Mity Kat baby bulldozers which push it into chutes that convey it to street level.

Structural steel next is cut up by acetylene torch and lifted in pieces by crane to the ground for removal. Once a floor section has been removed, the scaffold frames are lifted free and lowered by rope to the ground.

Lipsett foresees an increased use of rigid scaffolding on large demolition jobs.

"On smaller demolition the cost of using the rigid would be too high to make it practical at present," said Morris Lipsett, president of the firm.

The contractor used conventional methods to remove four 4-story houses and a 5-story apartment building adjacent to the Park Avenue building. Total demolition will be 5,000,000 cu ft of rubble.

sett was forced to turn to stationary scaffolding. These could be secured directly to the wall and removed as demolition progressed.

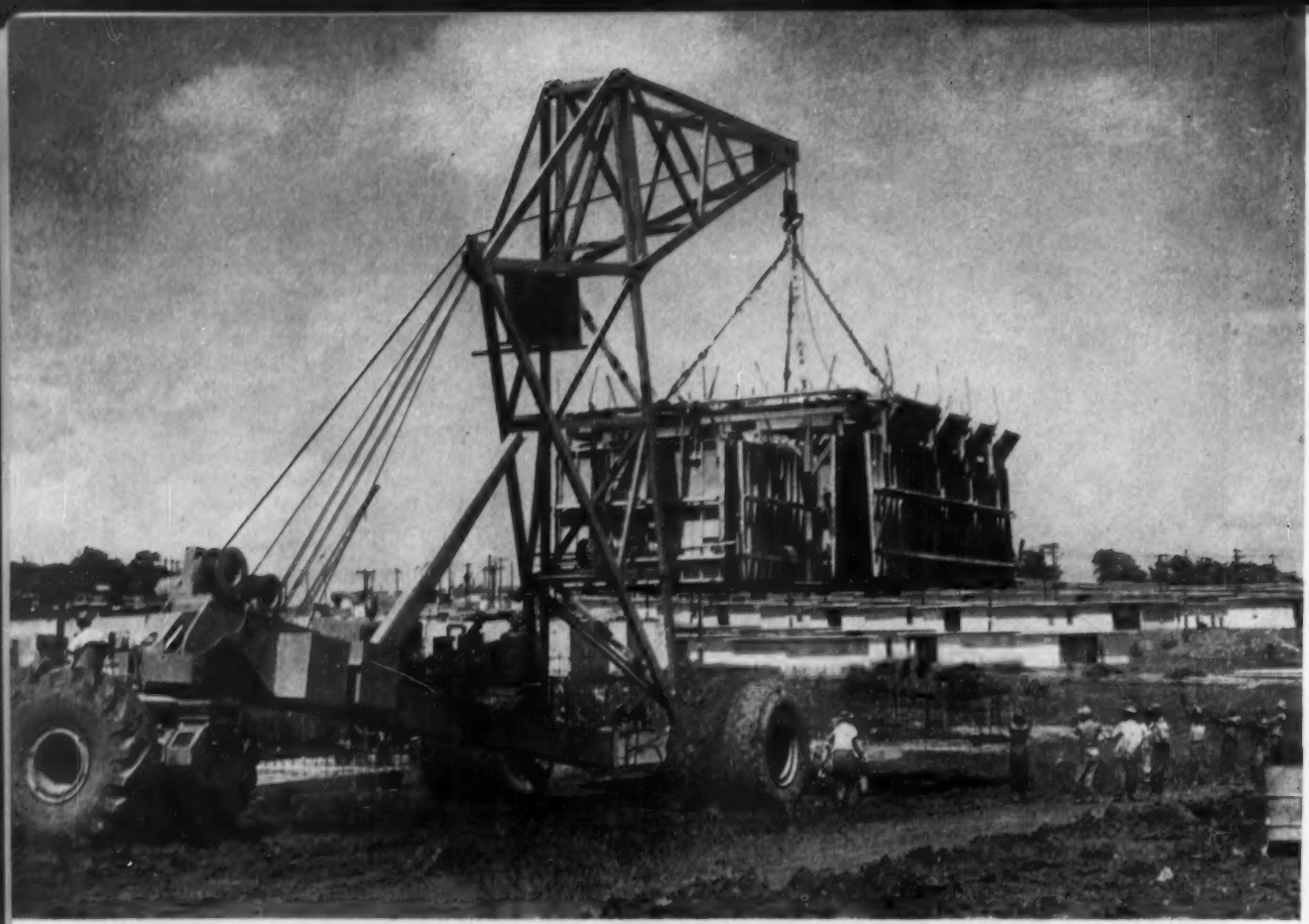
Time savings on that job, however, were not enough to offset the additional cost of the scaffolds. The savings on the Park Avenue job will be enough to do so, according to Lipsett.

Lipsett uses 2,236 frames of Trouble Saver sectional scaffolding. They measure 5 ft wide and 6 ft 6 in. high. They are spaced 6 ft apart and are erected over 580 ft of Gold Medal sidewalk bridge. Chesebro-Whitman furnishes and erects both scaffolds and bridge.

The frames are secured to the building by tubes which run from the frames through the windows.

WORKMAN JACKHAMMERS masonry on top floor while another burns through steel.

BABY BULDOZER, one of the three Mity Kats used on job, pushes rubble into chute.



**In Puerto Rico, with walls cast monolithically in this 35-ton steel form . . .**

# Concrete Houses Go Up in a Hurry

1 FOOTINGS ARE DUG by Gradall after engineers have outlined foundation pattern with lime. Excavated material is spread and tamped to receive 4-in. floor slab reinforced with 6x6/6-6 wire mesh. Integral foundation wall is 6 in. thick, 30 in. deep. In addition to footing excavation, 1½ million yd of soil is being moved for general site grading. Total work force is 700 men.

IT'S A RARITY to find a 750-sq ft poured concrete house for sale at $6,000 in Puerto Rico. It was, that is, until Las Lomas Development Corp. began turning out six such units per 8-hr day at a 1,600-home project near San Juan.

Key to the fast and economical construction of the five-room-and-bath dwelling is a huge steel form in which walls and main partitions for a complete house are cast monolithically. It takes only 1½ hr to strip, clean, set, and tie the form; 45 min to make the pour; and the cycle is repeated each day after an overnight curing period. Six forms let six houses be poured daily.

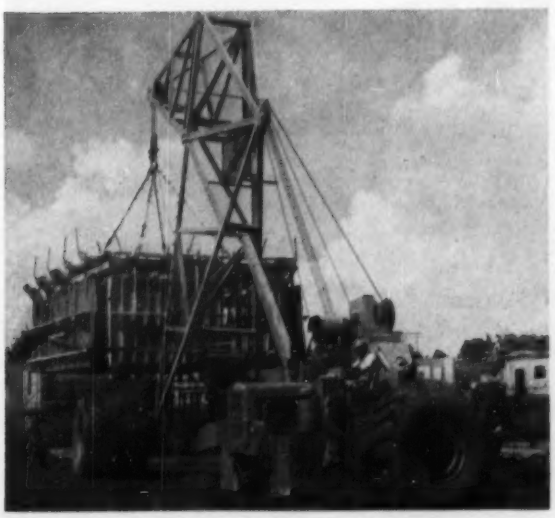
Walls, 5 in. thick, are cast in place atop previously poured 6x30-in. foundation walls that are integral with a 4-in. floor slab. Then, after walls are stripped, another steel form for some thin and complicated interior partitions is placed and poured. Lastly, a 4-in. precast 25x38-ft roof is lifted on. Roof concrete is a 6-bag, 3,000-psi mix; the rest is 5-bag, 2,000-psi.

Concrete for houses and 9 mi of roads totals 120,000 yd.

Las Lomas Development Corp. is a joint venture of Ibec Housing Corp. and Corbetta Construction Co., both of New York, and Rexach & Rivera Construction Co., San Juan. How their Project Manager Juan R. Brugueras, Field Superintendent Antulio Pietri, and Project Engineer Tony Torres are building the houses is shown step-by-step in the accompanying pictures.

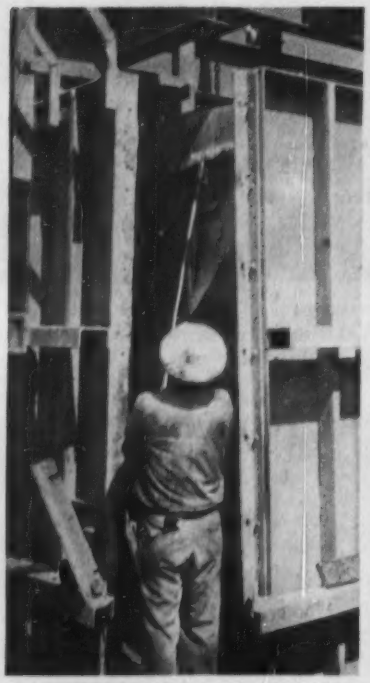
**2** SUBGRADE IS COMPACTED by LeRoi air tampers supplied from LeRoi 125-cfm compressor. Men with spades cut out for haunch at intersection of foundation and floor slab.

**3** FOUNDATION IS READIED for concreting. Work takes 2 hr, including ½ hr to pour 15 yd for the integral footing and slab. Plywood panels are reused as many as 200 times.



**4** WALL FORM IS HANDLED by 50-ton LeTourneau crane powered by 280-hp Buda diesel. Blaw-Knox steel form weighs 35 tons, and one house is cast in it each day. There are six of them on job.

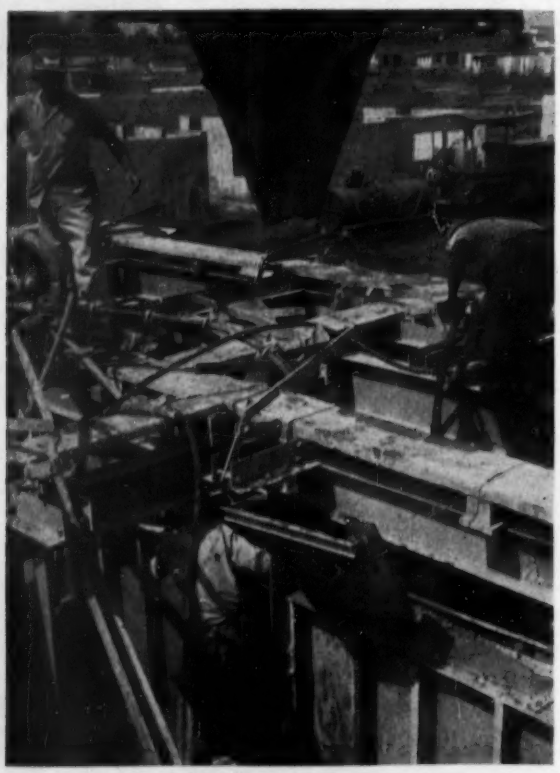
**5** FORMS ARE CLEANED by 100-psi air-water jet from sled-mounted Ingersoll-Rand Gyroflo 315-cfm compressor and 1,200-gal tank. House at right is ready for form. *(More photos next page)*



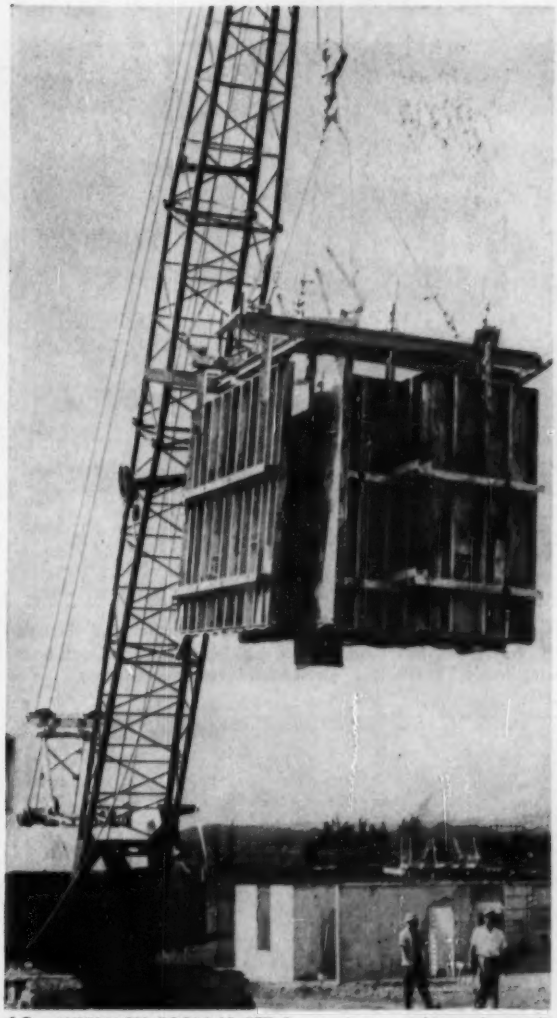
6 PANEL IS OILED, after cleaning, with a long-handled paint roller dipped in a mixture of Texaco Soluble C oil and water.

7 FORM IS ADJUSTED by furniture clamps and will be tied by through-bolts and other types of clamps built into it. Heavy form is not placed until third day after slab pour to allow time for curing and placement of reinforcing, conduit and rough plumbing.

8 CONCRETE IS POURED into wall form by Marion crane and GarBro bucket. House's walls and integral main partitions are 5 in. thick, call for 16½ yd of concrete which is poured in 45 min.

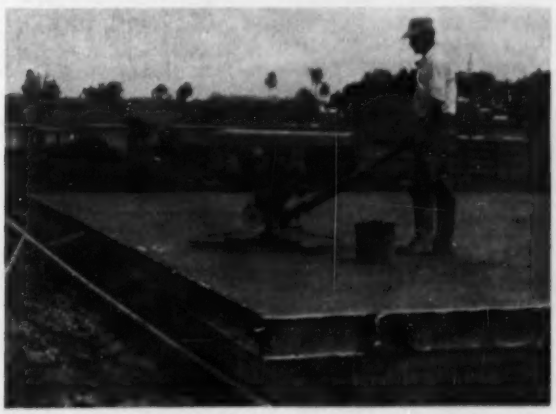


9 MIX IS VIBRATED by two Chicago Pneumatic internal units and six Cleveland units affixed to the form. Form will be stripped on day following pour by operating levered clamps on its top.

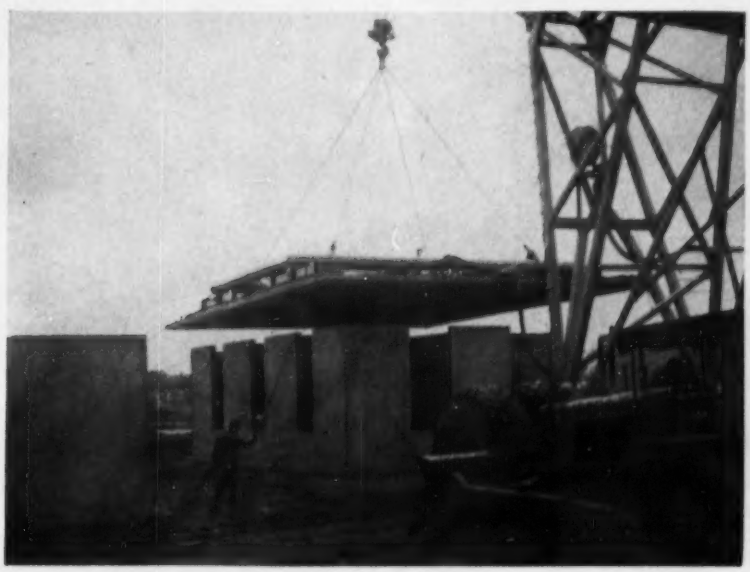


**10** AUXILIARY FORM IS SET for casting two thin and complicated additional interior partitions after main form is stripped. Rubber strips along bottom of form prevent concrete leakage.

**11** PARTITIONS ARE POURED by Koehring 304 crane in a few minutes because they are only 3 and 4 in. thick and call for a mere 4 yd of concrete. Those poured with walls are 5 in. thick.

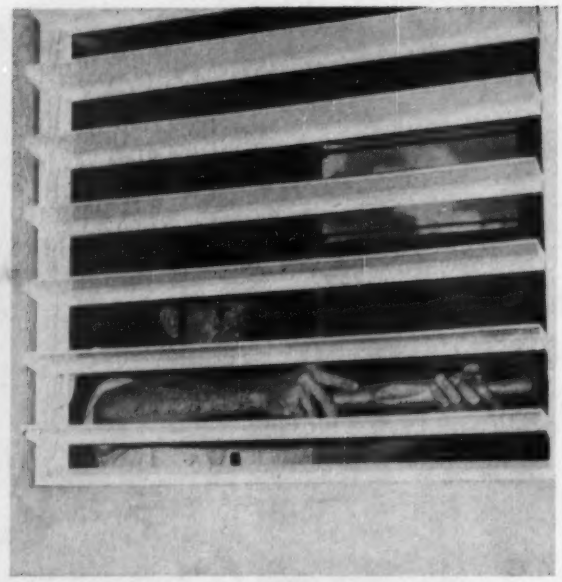


**12** ROOF SLAB IS FINISHED by Whiteman B44 machine after its 11½ yd of concrete are poured in 45 min on one of 12 casting beds. Slabs are precast one atop the other, often 15 high.

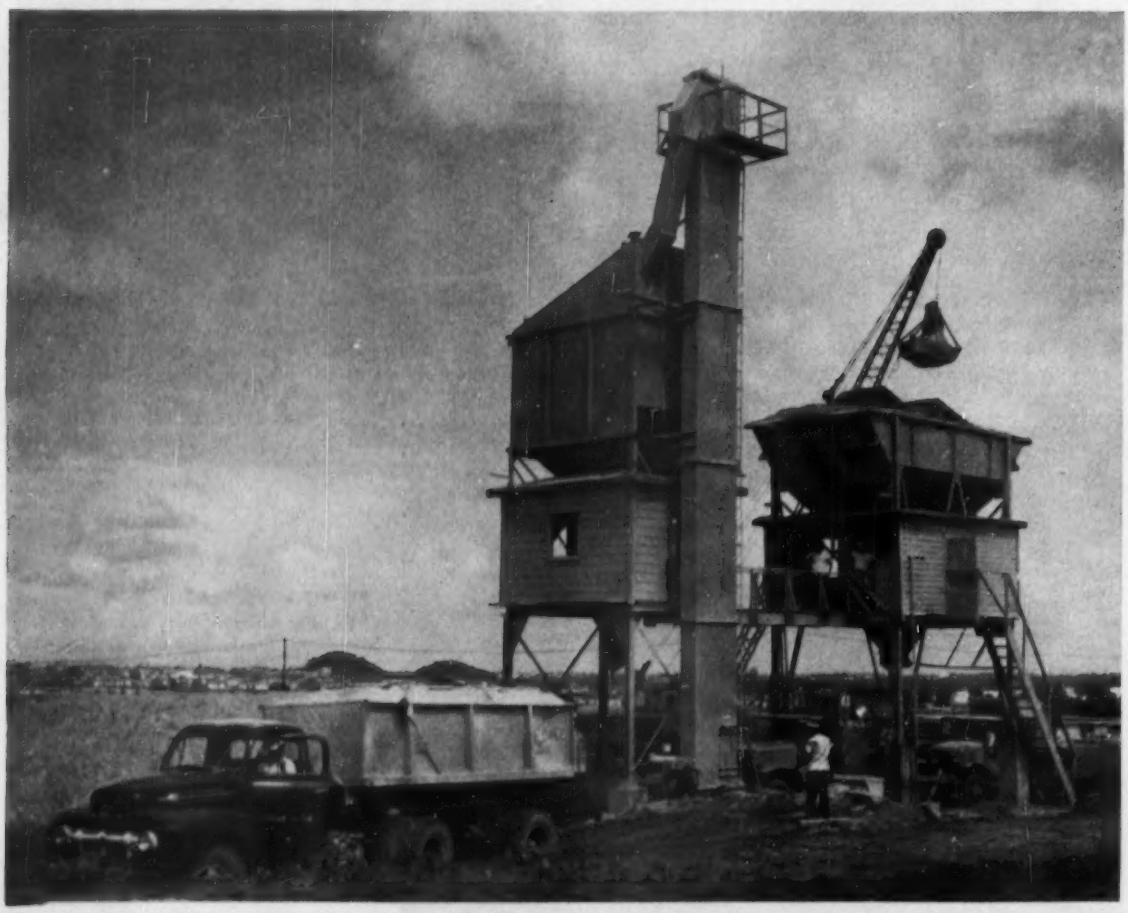


**13** ROOF IS PLACED by Tournacrane after minimum 7-day cure under Hunt compound. Rig handles 8½-ton lifter that clings to 22½-ton slab by 25-psi vacuum supplied by Hercules-driven Fuller pump on crane. Here, International TD-24 dozer backstops crane wheels as rig swings roof into position. *(More photos next page)*

**14** ROOF IS ATTACHED to house by welding together eight sets of inserts in walls and roof slab. P&H welder supplies current. A 3x6/3-4 mesh reinforces the 4-in. by 25x38-ft roof.



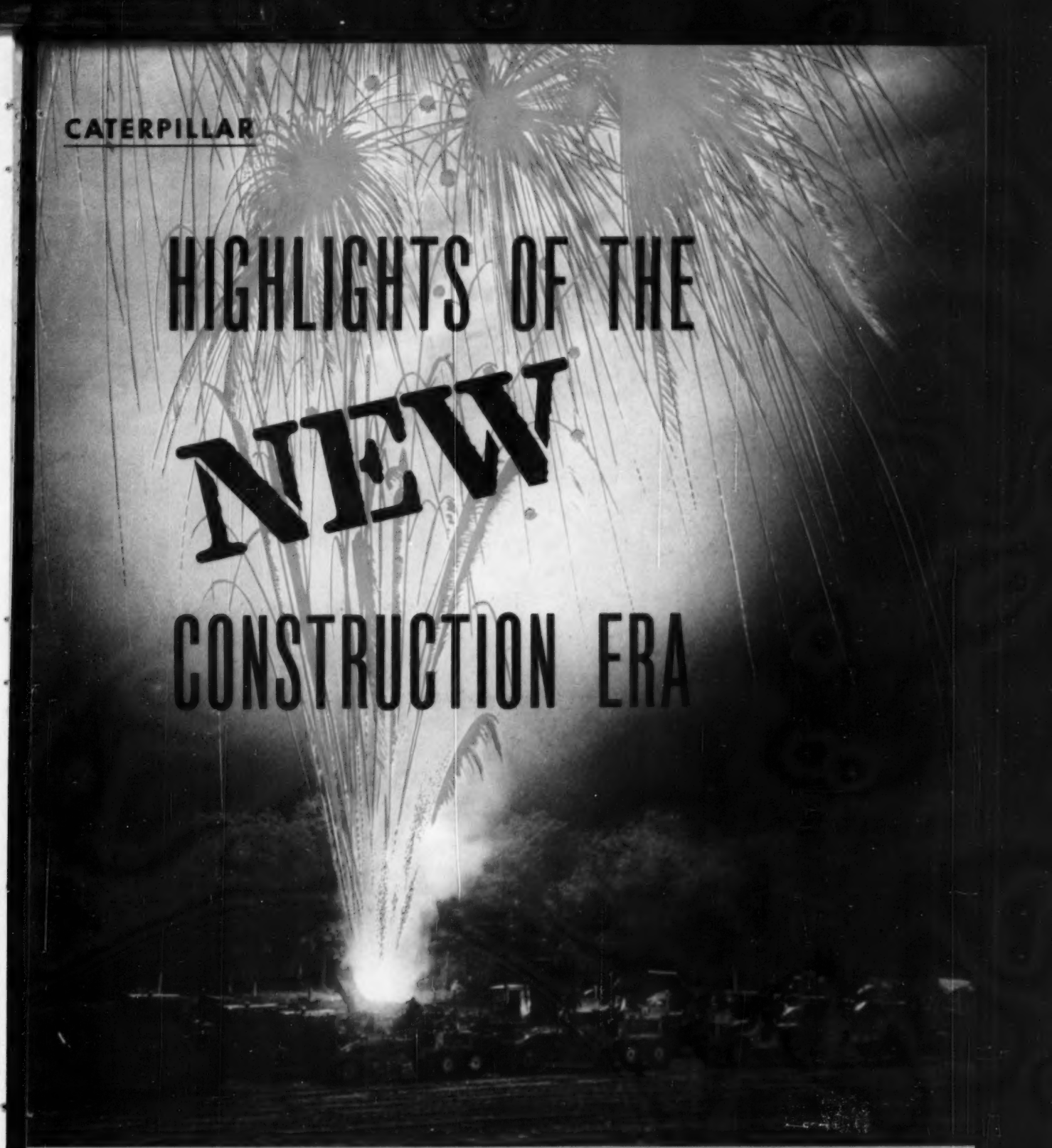
**15** JALOUSIES ARE INSTALLED by driving steel stud through frame and into concrete with powder-powered Drive-It tool. In semitropical Puerto Rico, glassed windows are unnecessary.



**16** CONCRETE IS BATCHED in Blaw-Knox plant at job site and mixed in fleet of two 4½-yd Blaw-Knox and twelve 3-yd Smith transit mixers on GMC Army-type 6x6 trucks. Fed by Unit clamshell, plant has 110-ton bins and 400-bbl silo, which here is about to receive 250-sack load of bulk cement delivered by Ford F-8 truck from near-by mill. Plant produces 450 to 500 yd daily.

CATERPILLAR

# HIGHLIGHTS OF THE NEW CONSTRUCTION ERA



Never before in history has the equipment industry faced such a tremendous challenge as today. We are entering what might well be called the "construction era." Right now construction is the greatest single factor in our industrial economy, employing 12% of our total labor force. But construction can never move forward by itself. Its progress is dependent upon increased production in mines and forests, cement mills and steel plants. Caterpillar Tractor Co. is matching these new opportunities with an array of new products that will increase production, cut maintenance costs, work longer and more profitably than any other equipment on the market. These Caterpillar-built products are the result of continuing research in the laboratory and in the field. They are forceful evidence of Caterpillar Leadership in Action. See them on the following pages.

# NEW in track-type tractors!

**The new D9**

This new giant is a bear for work. Choice of torque converter or exclusive oil clutch drive. First track-type tractor with Turbocharger. Completely new 286 HP engine. "Live-shaft" drive for rear-mounted equipment. Many other important features.

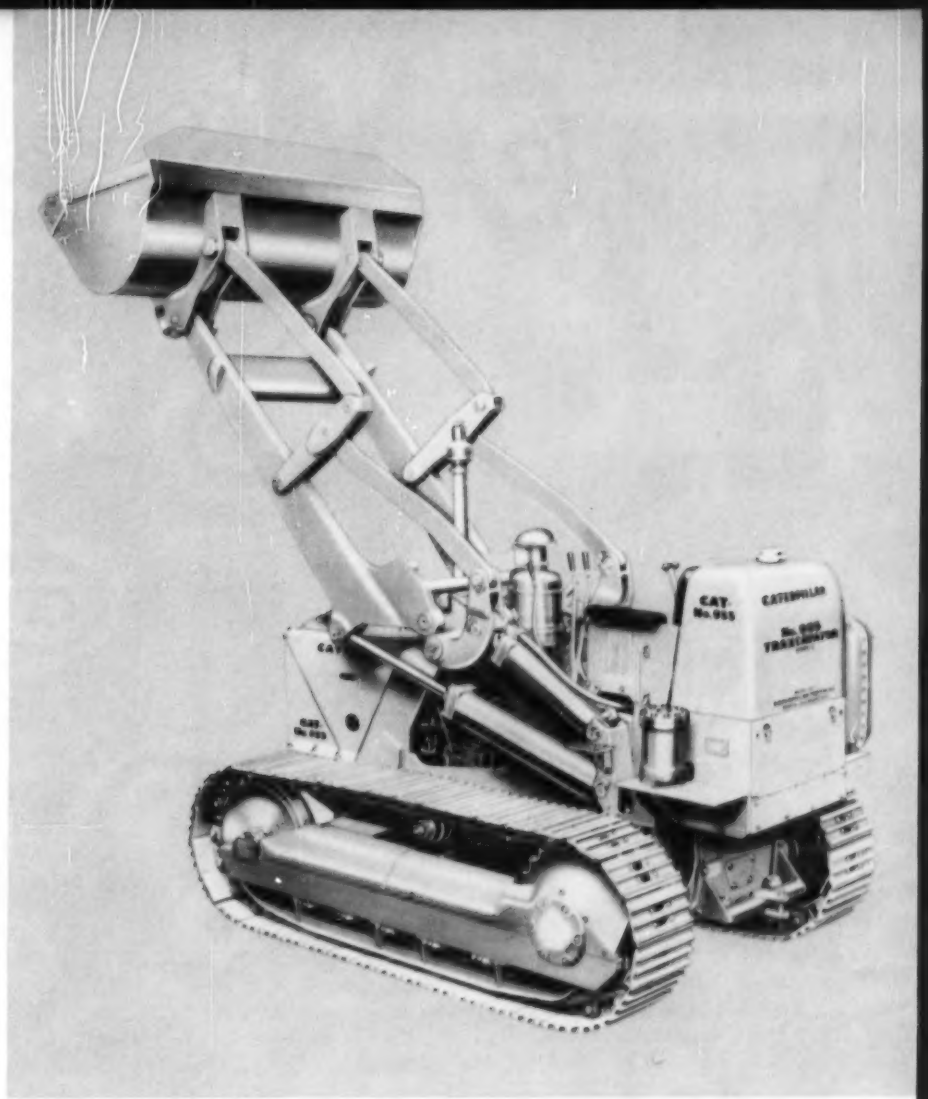
**The new D8**

With torque converter (Series D) or direct drive (Series E). Completely new 191 HP engine. "Live-shaft" drive for rear-mounted equipment independent of flywheel clutch. New easy controls. Many other improvements. Shown with new Cat No. 463 LOWBOWL Scraper.

**The new D7 (Series C)**

New 128 HP engine. Drawbar pull 28,700 lb. maximum. Exclusive oil clutch. Finger-tip steering. New starting engine for easier operation. Track shoes hardened by "*water quench*" process (also on D8 and D9). Many other important advances.

LEADERSHIP IN ACTION



**No. 955 — 1½-yard capacity**

*Balanced* for bigger production at lower cost. Major features: 40-degree bucket tip-back at ground level, new oil-type clutch, convenient lift and dump levers, modern hydraulic system, high reach, "designed in" operator comfort, optional starting and versatile attachments.

# NEW in Traxcavators!

**No. 933 — 1-yard capacity**

Like its bigger brother, *balanced* to outproduce ordinary tractor-shovels of equivalent capacity. Also backed by *one* manufacturer to provide you the advantages of single manufacturing responsibility and one service source. Major features—same as the No. 955!

LEADERSHIP IN ACTION

# NEW in wheel-type tractors!

**The new DW21 Tractor** ▲

(Series C.) New 300 HP Caterpillar Engine with Turbocharger. 10% more rimpull. New No. 470 LOWBOWL Scraper. 18 cubic yards struck, 25 cubic yards heaped capacity. New, wide-section 29.5-29 tires give big-footprint flotation and maximum traction. Many other new, thoroughly tested features.

**The new DW15 Tractor** ▶

(Series C.) 186 HP valve-in-head Caterpillar Engine. Speeds up to 24 MPH (31.3 MPH with optional gears) pulling loaded wagon or scraper. Heavy-duty clutch has air booster. Air brakes. Wide range of speeds: 10 forward, 2 reverse.

**The new DW20 Tractor**

(Series E.) Shown with new No. 456 LOWBOWL Scraper. This great new team highballs up to 32.1 MPH for fast cycle times. Same 300 HP engine with Turbocharger and wide-section tires as DW21. LOWBOWL design loads more material in less time by using tractor and pusher power at maximum efficiency.

LEADERSHIP IN ACTION

# NEW in pipelayers!

**The new No. 583**

Here, for the first time, is a pipelayer that is *all* pipelayer—not a tractor attachment. It's the most efficient, highest capacity pipelayer in history. Lifting capacity of 130,000 pounds and 21-inch clearance. Three-stage torque converter in main drive and new hydraulically actuated counterweights. Stability is unequalled. A heavy-duty constant-mesh pipelayer winch transmission drives directly from the engine. Many more important advances, all designed to produce more profits for pipeliners.

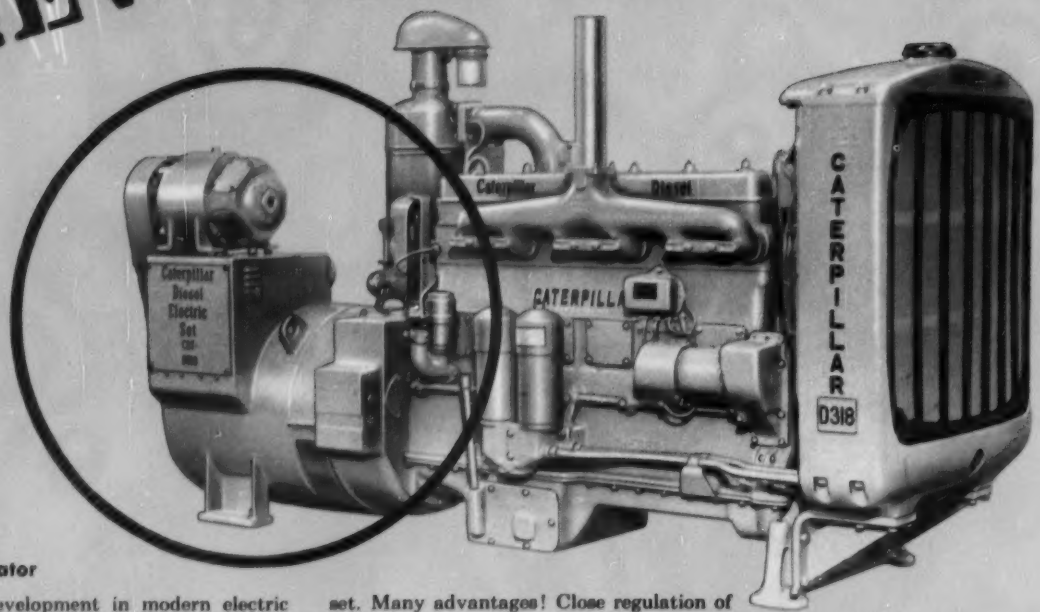
# NEW in motor graders!

**The new No. 12 with oil clutch**

With the addition of the job-proven oil clutch, the big, versatile No. 12 Motor Grader gives you more economy and efficiency than ever. The new clutch increases work life since the constant oil bath lubrication reduces wear on all moving parts. There is less maintenance; 1500 hours without adjustment is not unusual and no external lubrication is needed. The new No. 12 is more efficient because the clutch is constantly cooled, eliminating clutch fade and slippage due to overheating.

LEADERSHIP IN ACTION

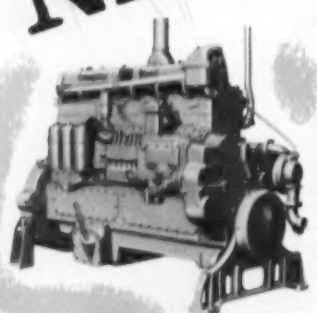
# NEW in generators!




**Cat Generator**

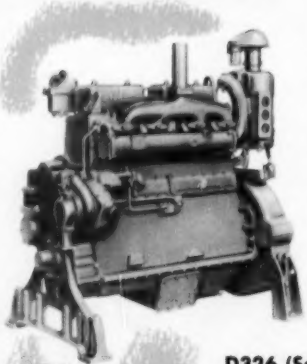
A major development in modern electric power. Brings to Caterpillar's new line of Diesel Electric Sets the efficiency of the externally-regulated set in a self-regulated set. Many advantages! Close regulation of voltage, simple control, excellent motor-starting ability, easy hook-up with other generators . . . 100% backed by Caterpillar.

# NEW in diesel engines!



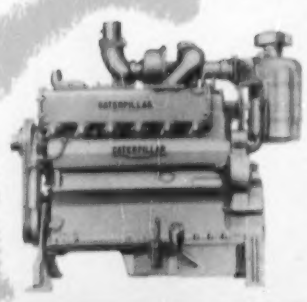
**D342—210 HP maximum @ 1200 RPM**

Incorporates the latest advances in modern, compact, heavy-duty diesel design. Offers better operation, less maintenance, higher horsepower. Choice of 3 starting systems—air, electric, gasoline. Like all Caterpillar Engines, burns wide range of fuels without fouling.



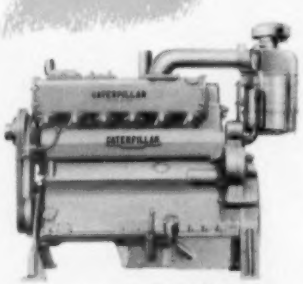
**D339—140 HP maximum @ 1200 RPM**

Combines new compactness with greater efficiency, economy and higher horsepower. A modern, heavy-duty 4-cylinder unit with new smoothness of operation. Choice of 3 starting systems. Many other advantages, including full-flow filtering system.



**D337 (Series F) with Turbocharger 310 HP maximum @ 2000 RPM**

New Turbocharger utilizes exhaust heat to drive supercharger, delivers air in proportion to engine's need. New hydraulic valve lifters practically eliminate adjustment, provide quiet operation. Greater displacement for more power. Choice of 3 starting systems. Available as Electric Sets and Industrial Engines with complete line of attachments.



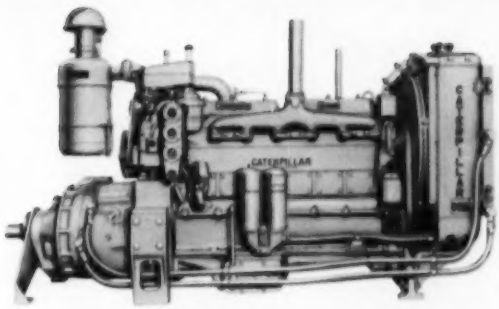
**D326 (Series F)—200 HP maximum @ 2000 RPM**

Like other new, heavy-duty Cat Diesels, offers you more for your money than any engine in its power range. Many major features, including hydraulic valve lifters and full-flow filtering. Greater displacement for more power. Choice of 3 starting systems. Available as Electric Sets and Industrial Engines with complete line of attachments.

LEADERSHIP IN ACTION

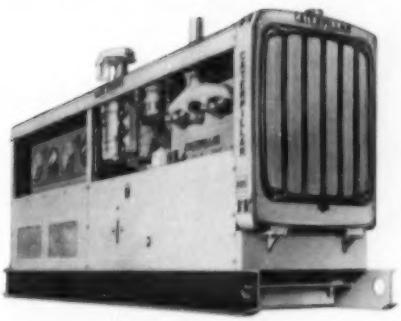
# NEW in torque converters!

Caterpillar now offers a wide choice of torque converter power units in standard packages. Torque output is automatically matched to load for smooth load starts or control of load without use of clutch. Overloads can't kill engine. Your Caterpillar Dealer can supply these units. He also has full facilities and parts for service.



# NEW in welders!

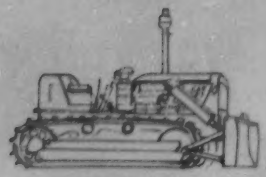
The new Caterpillar Twin Arc-Welder provides one engine, one base, and TWO 300-ampere welding generators. Four-cycle Cat Diesel picks up load instantly without missing or injector trouble. Compact design cuts transport and maintenance cost. Operators can weld at different voltages at same time. Single (3 KW) exciter cuts weight and size, provides ample excitation plus plenty of 115-V. DC for auxiliary tools.



# NEW in portable electric sets!

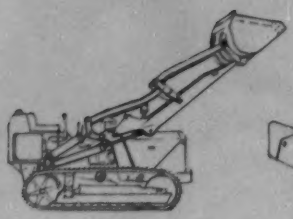
Cat Portable Electric Sets are now available in nine models, 30 to 315 KW, and in all usual voltages, 50 to 60 cycle. They're complete units with cooling system, fuel tank and switchgear, mounted on skids, semi-trailer or full trailer. Easy to hook up and operate, ready to work anywhere.

LEADERSHIP IN ACTION

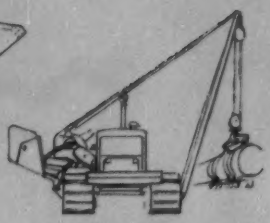


TRACK-TYPE TRACTORS

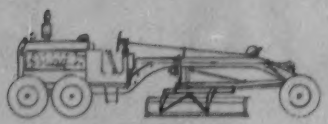
WHEEL-TYPE TRACTORS



TRAXCAVATORS



PIPELAYERS

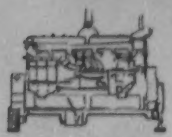


MOTOR GRADERS

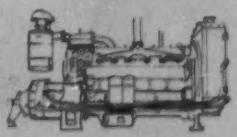
SCRAPERS

BULLDOZERS

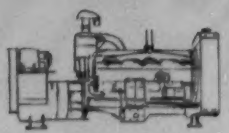
RIPPERS



INDUSTRIAL ENGINES



TORQUE CONVERTERS



GENERATORS

# FOR YOU CATERPILLAR LEADERSHIP PROVIDES THE MOST COMPLETE LINE IN THE INDUSTRY

PORTABLE ELECTRIC SETS

WELDERS

Year after year you have seen the results of Caterpillar leadership. It is always in action. It never stands still. The full resources of Caterpillar research, both in the laboratory and right in the field with you, are constantly devoted to improving products and developing new ones. This means that Caterpillar is your partner in progress, bringing you better and better products, greater opportunities for profitable work. Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

**CATERPILLAR***

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**LEADERSHIP IN ACTION**

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(Advertisement)

# INCREASING FOOTAGE OF DIAMOND CORE DRILLS

## with Stoody Acetylene Tube Borium

When we think of diamond studded tools, hard-facing seems unnecessary... after all, the diamond is nature's hardest, most wear resistant substance. Although core bits and their connecting reamers are set with industrial diamonds for extending overall life, the barrels and flutes don't benefit by these inserts. Here's how one operator increased footage of sampling drills from 400 or 500 feet to between 2000 and 3000 feet.

After making comparative tests of several hard-facing materials, 30-40 Acetylene Tube Borium (containing tungsten carbide particles) was selected because of its excellent wear resistance. Reamer bodies were hard-faced with a series of parallel longitudinal beads, the deposits extending around those areas containing the diamond inserts.

Since walls of the core barrels are thinner at each end because of internal threads, wear weakens these areas quicker than the remaining barrel. By hard-facing back 6" from each end and adding extra protection over the threaded areas overall barrel life is equalized. When the hard metal is gone the entire barrel has delivered maximum service. Flutes, attaching core barrels to drill rods, are hard-faced on outside diameters.

*Straight edge of saw blade shows how hard-faced end of barrel has held its size.*

Stoody Hard-Facing Alloys afford maximum protection to all wearing equipment. For recommended alloys and application technique on your specific wear problems refer to the

*Notice how hard-facing beads surround but do not cover diamond inserts.*

Stoody Hard-Facing Guidebook. Your Stoody dealer has a copy for you or write direct.

**STOODY COMPANY**

11972 East Slauson Avenue

Whittier, California

CONCRETE LINING of the Weber Basin Project's Gateway Canal near Ogden, Utah, is done by a Guntert & Zimmerman slip-form paver. Job calls for 22,000 cu yd of concrete to be placed to a thickness of 4 in. for the 7.5-mi reclamation canal.

# Canal Job Goes Ahead Fast

A SLIP-FORM CANAL LINING MACHINE is placing gravel base material as well as installing concrete for the Gateway Canal in Utah. This procedure is one important reason why Morrison-Knudsen Co., Inc., is almost a year ahead of schedule on construction of the $2 million, 7.5-mi canal.

Gateway Canal is an essential feature of the U.S. Bureau of Reclamation's Weber Basin Project which will supply agricultural, industrial, and domestic water to the area around Ogden, Utah. The 4-in. thick concrete lining has a finished bottom width of 10 ft. The canal is lined to a depth of 8 1/3 ft with 1½ on 1 side slopes.

A Guntert & Zimmerman canal lining machine places the concrete. During the course of organizing the job, M-K officials came up with the idea that this same machine could also place the gravel base material.

Most of the base is 4 in. thick—the same thickness as the concrete lining. This gravel thickness was placed with little difficulty. But, about 5% of the canal length is through an expansive clay formation that requires special treatment. First, the excavated subgrade is coated with catalytically blown asphalt. Then, a 14-in.—instead of 4-in.—thickness of gravel base is placed. The liner places this extra thick base, too, but with some difficulty because of the extra width of the excavation.

Base gravel is 2½-in. maximum size pit-run material. It includes a substantial—but not excessive—amount of sand. The gravel is dry-batched into compartmented Mack trucks. The trucks dump into a Koehring 34E Twinbatch paver normally used for concrete mixing. Water is added in the mixer to give the gravel a plastic consistency. Then the canal liner places the gravel much the same as it would concrete.

The Koehring paver boom is equipped with a conveyor belt rather than the usual bucket. Pur-

## ...and Lays Gravel Base, Too

GRAVEL BASE 4 in. thick is placed by the same machine. Workman in the bottom of the ditch operates electrical controls that govern the progress of the lining machine.

pose is to provide more positive control on feed to the hopper buggy that rides the canal liner.

Under normal operating conditions, the canal liner is used to place subgrade on the night shift and to place concrete on the day shift. By following this procedure, as much as 1,200 ft of canal have been lined in 24 hr. That's for 4 in. of base material and 4 in. of concrete. On sections requiring 14 in. of base (2 cu yd per ft of canal), progress is slower, and normal schedules must be altered.

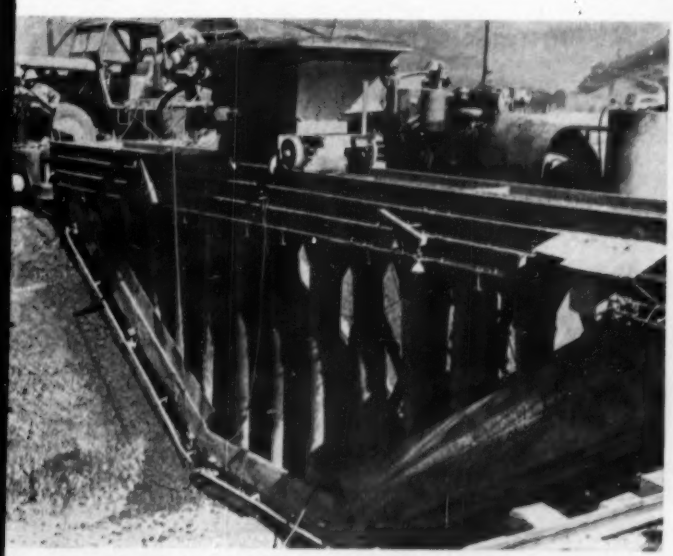
The job calls for 22,000 cu yd of concrete. Bid price on concrete for canal lining was $21 a cu yd for the first 10,000 cu yd and $15.75 a cu yd for concrete in excess of that. This does not include cement, which was bid at $4.20 a barrel.

Concrete is dry-batched in a 1½-cu yd capacity Conveyco plant and hauled to the point of use. With 3½ mi the longest haul, seven Mack trucks, handling four batches each, keep up with lining operations.

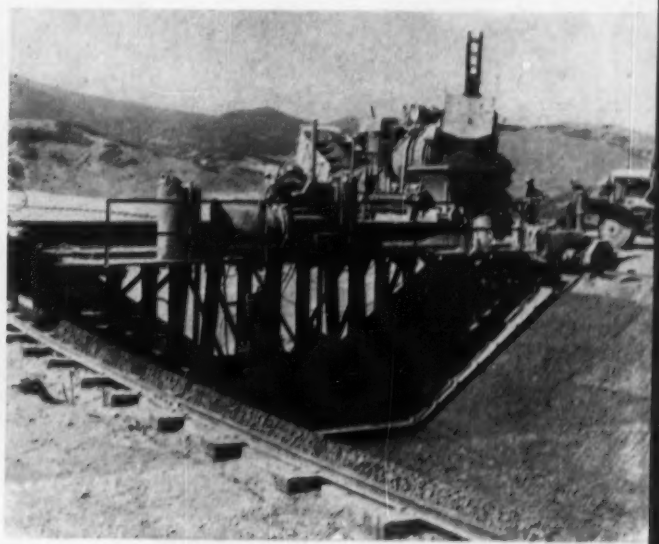
Specifications require a 0.53 water-cement ratio and six-sack mix. Using 1½-in. maximum size aggregate, this gives 28-day concrete strengths in the 5,000- to 6,000-psi range.

Contraction joints are cut in the fresh concrete with hand tools. No strips are used.

*(Continued on page 80)*



RAIL-MOUNTED BUGGY distributes gravel to metal elephant trunks. Mixing with water makes gravel plastic enough for placing.



EXTRA THICK BASE of 14 in. through an expansive clay formation is placed with difficulty because of width of excavation.

# A. & J. CARTAGE COMPANY *Reduces Maintenance Costs with Phillips 66 HDS Motor Oil*

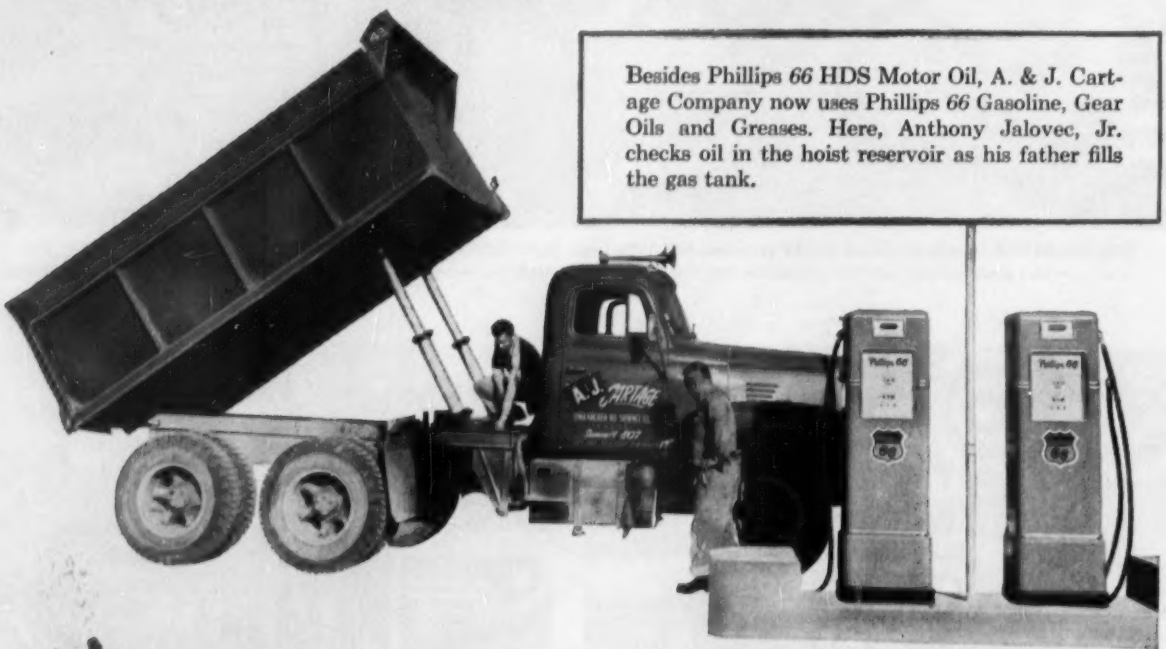
*Tony Jalovec, A. & J. Cartage Company*

TONY JALOVEC operates the A. & J. Cartage Company in Summit, Illinois. Rock, asphalt, dirt, sand—all are hauled by his 15 International L190 late model dump trucks. Each truck's powerful 406 engine pulls a 13-ton pay load. Each truck operates six days a week, and covers 40,000 miles a year.

Before using Phillips *66* HDS Motor Oil, Mr. Jalovec had an engine failure. Says he: "The oil was more like mud than oil. The pan was loaded with sludge. We had to scrape 'gunk' off every part. One look at that dirty engine and I decided to switch oils and do it quickly. That's what I did."

Mr. Jalovec started using Phillips *66* HDS Motor Oil in all A. & J. trucks. With Phillips *66* HDS, his maintenance record showed a big improvement. Trucks gave efficient operation without overhaul right through trade-in time—three years without any heavy repair cost!

Tony Jalovec's satisfaction with Phillips *66* Heavy Duty Motor Oils is typical of reports from fleet operators in all parts of the country. No matter what kind of fleet you operate, you can enjoy the same satisfactory service.



Besides Phillips *66* HDS Motor Oil, A. & J. Cartage Company now uses Phillips *66* Gasoline, Gear Oils and Greases. Here, Anthony Jalovec, Jr. checks oil in the hoist reservoir as his father fills the gas tank.

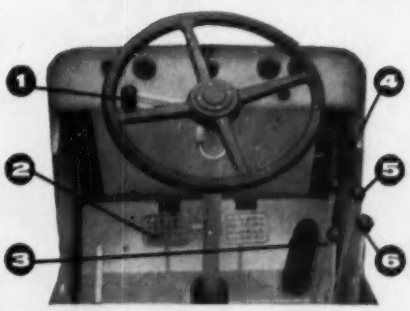
Test Phillips 66 Heavy Duty Motor Oils against the oil you are now using. A Phillips 66 Lubrication Engineer will be glad to help you set up a test. Write to: Sales Department, Phillips Petroleum Company, Bartlesville, Oklahoma.

*It's Performance That Counts!*

Phillips 66

## PHILLIPS 66 HEAVY DUTY MOTOR OILS

# Faster, more power,
# and LOOK, NO CLUTCH!




## It's a pleasure to work here!

1. **Power-shift levers:** for Forward-Reverse and High-Low; make any shift while moving in either direction.
2. **That's no clutch!** It's a double-pedal brake, use it with either foot.
3. **Break-out bucket lever:** work the bucket in the pile—you've got two big double-acting bucket cylinders for tremendous breakout power, independent low-level tip back.
4. **Range Shift:** working or travel speed
5. **Drive Selector:** 4-wheel and 2-wheel
6. **Boom Control**

Until you see a MICHIGAN in action, you won't believe that it's possible to deliver so much power with such ease of operation. Your driver stays at peak efficiency all day long because there's no conventional clutch on a MICHIGAN. Instead, the MICHIGAN's exclusive power-shift transmission does all the shifting hydraulically—and eliminates the most notorious cause of excessive maintenance and driver fatigue.

In addition to effortless, instantaneous shifting, you get up to 300% torque multiplication on a MICHIGAN —from the Clark-built converter. With this kind of smooth, shockless power transmission, you get the full advantage of the MICHIGAN's extra weight and higher horsepower.

A demonstration (on your own job, if you wish) is the only way to get a real understanding of what this machine can do! Just write or call us—and don't forget that all MICHIGAN's are available on the low-cost MICHIGAN Lease Plan.

CLARK EQUIPMENT

**CLARK EQUIPMENT COMPANY**
**Construction Machinery Division**
**380 Second St., Benton Harbor 28, Michigan**
**Phone: WA 6-6184**

ROUGH EXCAVATION for $2 million Gateway Canal is accomplished by Wooldridge scrapers hauled by Caterpillar D8 tractors.

FINAL EXCAVATION is handled by Caterpillar DW10 tractor-scrapers. Sheepsfoot rollers compact backfill on unstable earth.

## Scrapers Dig Gateway Canal

Excavating the canal was largely a scraper operation. Clearing and pioneering work was accomplished by Caterpillar No. 12 motor graders that leveled the surface. Then rough excavation was handled by Wooldridge scrapers hauled by Caterpillar D8 tractors. Caterpillar DW10 rubber-tired scrapers, small enough to operate effectively in the canal width, made the final excavation. Finish grading was handled by motor graders.

Included in the work is about 1,000,000 cu yd of canal excavation. On this earthwork Morrison-Knudsen bid 28c a cu yd for the first 500,000 cu yd of excavation and 20c a cu yd for excavation in excess of that.

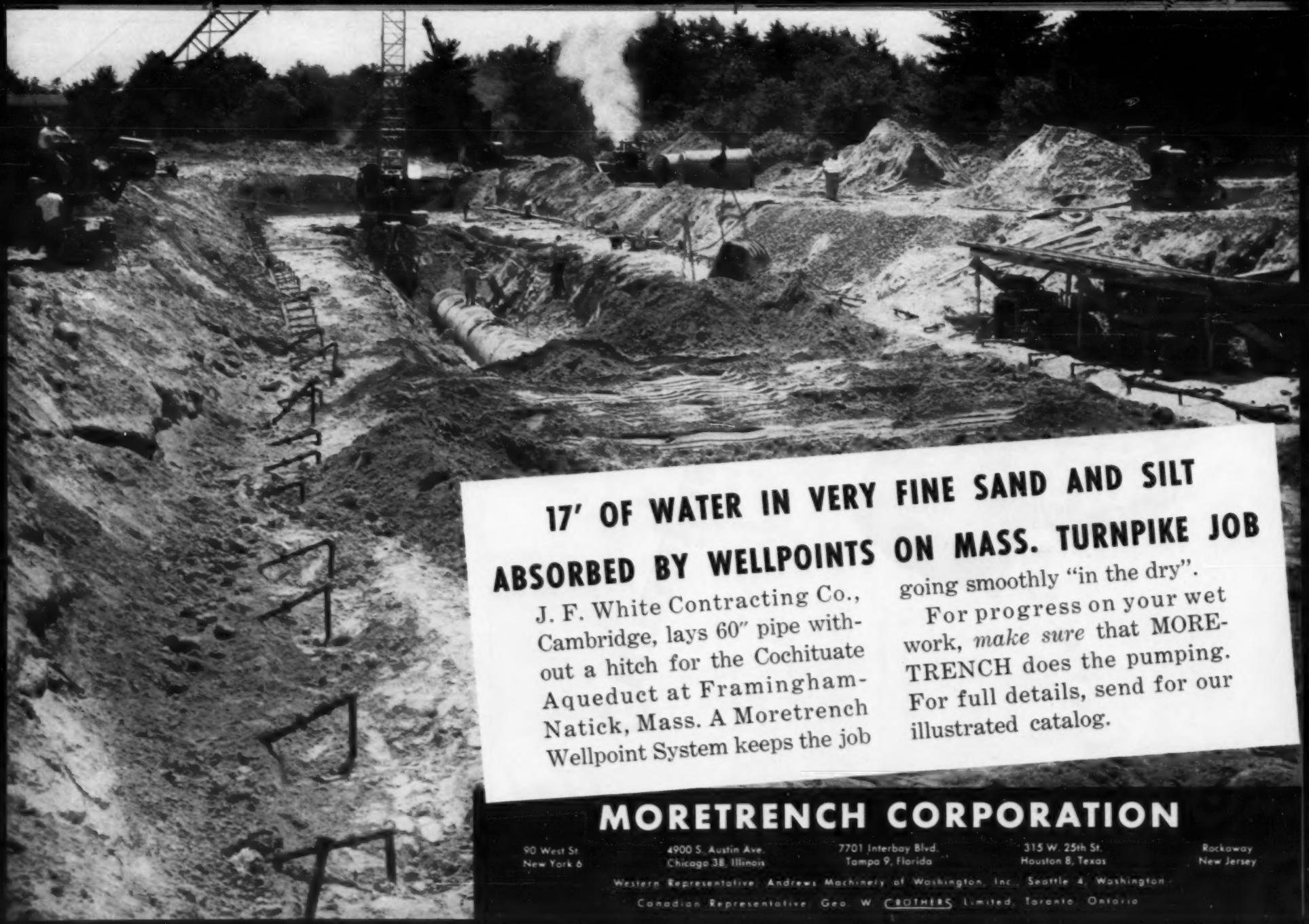
CONCRETE PIPE for 700-ft siphon under a ravine is placed by Bucyrus-Erie 54B crane. Pipe sections are 11 ft in dia and measure 8 ft long. Each section weighs 21 tons.

### Crane Performs Double Duty

The canal has several siphons carrying it under ravines. Longest siphon is 700 ft. It includes 11-ft dia concrete pipe set in 8-ft sections weighing 21 tons each. A Bucyrus-Erie 54B crane places the pipe, and, rigged as a dragline, handles siphon excavation.

The Gateway Canal job is the first major USBR contract where the surveying is done by the contractor. The Bureau of Reclamation provides a center line location and elevation control system at the start of the job. From then on it is up to the contractor to reference out this center line and provide necessary grade stakes and the like. Advantage is that the contractor has full control over survey crews. If grade stakes aren't available when he needs them, it's his own fault. So far this scheme has worked rather well on the Gateway Canal project.

I. D. Robbins is project manager for Morrison-Knudsen Co., Inc., and Russ Healy is general superintendent. For the Bureau of Reclamation, Clinton D. Woods is project manager, L. R. Dunkley is construction engineer, Ross D. Billings is resident engineer, and Ray Hardy is assistant resident engineer.



# 17′ OF WATER IN VERY FINE SAND AND SILT ABSORBED BY WELLPOINTS ON MASS. TURNPIKE JOB

J. F. White Contracting Co., Cambridge, lays 60″ pipe without a hitch for the Cochituate Aqueduct at Framingham-Natick, Mass. A Moretrench Wellpoint System keeps the job going smoothly "in the dry".

For progress on your wet work, *make sure* that MORETRENCH does the pumping. For full details, send for our illustrated catalog.

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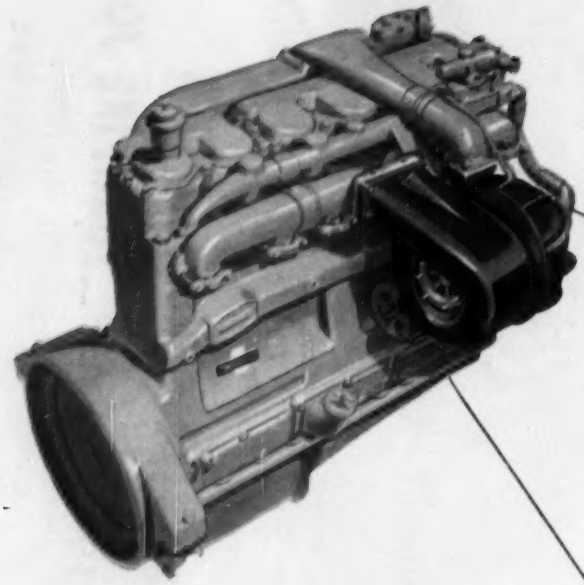
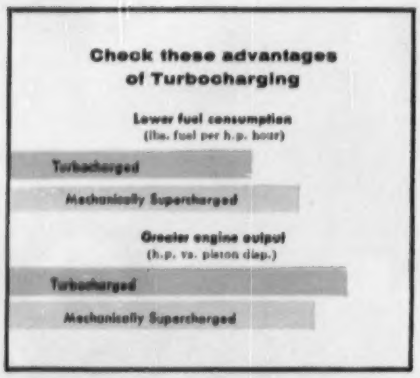


# Cummins Turbodiesels •




Five new Cummins Turbodiesels (175 . . . 250 . . . 262 . . . 300 . . . and 600 h.p.) now feature the sensational new development—exhaust gas turbocharging of high-speed diesels.

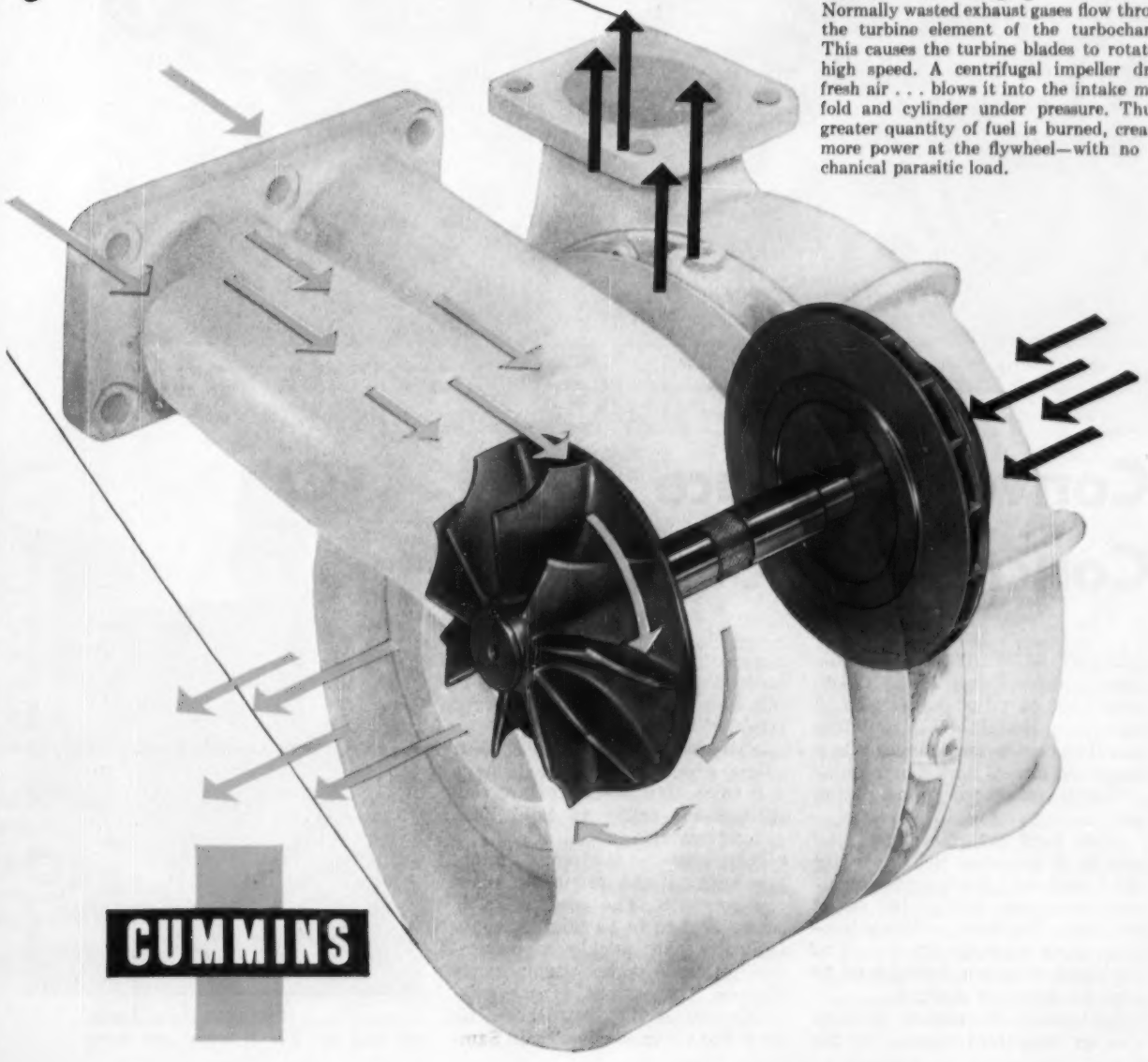
They give you more economy . . . better performance than naturally aspirated or mechanically supercharged engines. Exhaust gas energy normally wasted is harnessed to achieve a more perfect air-fuel mixture in the combustion chamber, without any parasitic load. (See diagram at right.)

If you want reduced fuel costs . . . longer engine life . . . lowest possible weight per horsepower . . . and maximum profits . . . get full details on Cummins Turbodiesels from your nearest Cummins Distributor.

*Cummins Diesels are available in the equipment of over 40 leading manufacturers.*

Cummins Engine Company, Inc. • Columbus, Indiana

# . . put waste heat to work!



flow of exhaust gases

flow of intake air

*Cummins Turbocharging* — how it works. Normally wasted exhaust gases flow through the turbine element of the turbocharger. This causes the turbine blades to rotate at high speed. A centrifugal impeller draws fresh air . . . blows it into the intake manifold and cylinder under pressure. Thus a greater quantity of fuel is burned, creating more power at the flywheel—with no mechanical parasitic load.

**CUMMINS**

CONVEYOR-CHUTE TEAM speeds one day concreting of sub-cellar of new $20 million Buffalo branch of Federal Reserve Bank of New York. Pressure slabs, 4 ft thick in sub-cellar and 2 ft thick in cellar portion of building, are to hold back ground water.

# Conveyors Place Concrete for Slab

CONVEYOR BELTS enabled William L. Crow Construction Co. to pour 1,100 cu yd of concrete in 13 hours on a Buffalo, N. Y., building job. The contractor believes this is one of the largest non-stop foundation pours on record for a building job.

Crow used concrete chutes and two 40-ft conveyor belts to place 195 transit-mix truck loads of concrete at a pour rate of 100 cu yd per hour. The firm's concrete handling costs were $1 per cu yd as compared with an average of $3 a yd by standard methods.

An unusual foundation problem was an important reason for the choice of this method of placing the foundation for the $4 million Buffalo branch of the Federal Reserve Bank of New York.

A high water table only 10 ft below ground level called for a 4-ft thick, 79x105-ft pressure slab in the sub-cellar to hold back ground water.

Normally, a contractor might use buckets and cranes to place the concrete. The pressure slab, however, had to be poured monolithically and quickly to prevent the ground water, temporarily drained, from rising.

"Cranes would have been too slow and too expensive," said Sam-

CONCRETE DISCHARGES from transit-mix truck into 2-cu ft hopper and moves

uel Frothingham, Crow's project manager.

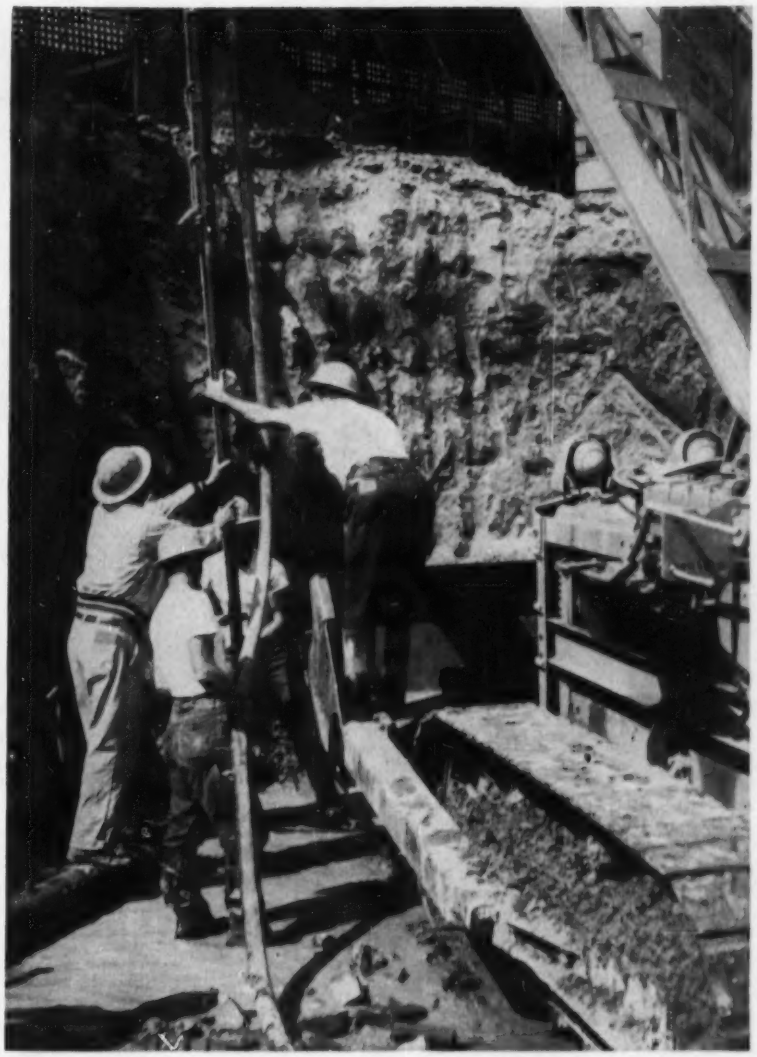
A minimum of four cranes, he said, would have meant an operator and oiler per rig, a man to control bucket loading, a man to spot bucket discharge, and three or more men to handle the discharged concrete.

"Of course, if the job were much larger, it would have paid to either pump the concrete through pipe or make use of cranes and buckets," Frothingham said. "But for this type of job, conveyors were cheap, efficient, and easy to maintain."

Frothingham and his superintendent, H. W. Sturcey, used two model 12-40 American conveyors operated by 6-hp gasoline AEN Wisconsin engines. The units were mounted on rubber tires whose axles were set on pivots. This permitted side to side as well as backward and forward motion.

Set on opposite excavation banks, the conveyors were easily accessible to transit-mix trucks. Their 40-ft lengths enabled them to cover the entire central range of the pour with few rig movements. Secondary chutes distributed the concrete from the dump ends of the conveyors.

The trucks released a steady flow of concrete into 2 cu ft hoppers provided with flow control gates which opened onto the conveyor belts. Operators stationed at the machines prevented clogging at the control gates. Three men at the dump ends of each conveyor handled the discharged concrete.



JETTING WELLPOINTS to 30-ft sub grade level preceded pouring of pressure slab. Contractor used 180 Moretrench wellpoints to drain almost 3,000,000 gal of water from site.

through flow control gate onto 40-ft belt. Gasoline 6-hp engine powers conveyors.

Heavy duty, 12-in.-wide, rubber-fabric belts proved especially adaptable to handling the stiff 4,000-psi mix used. Frothingham was so satisfied with the results that he plans to use the belts to pour the foundation walls.

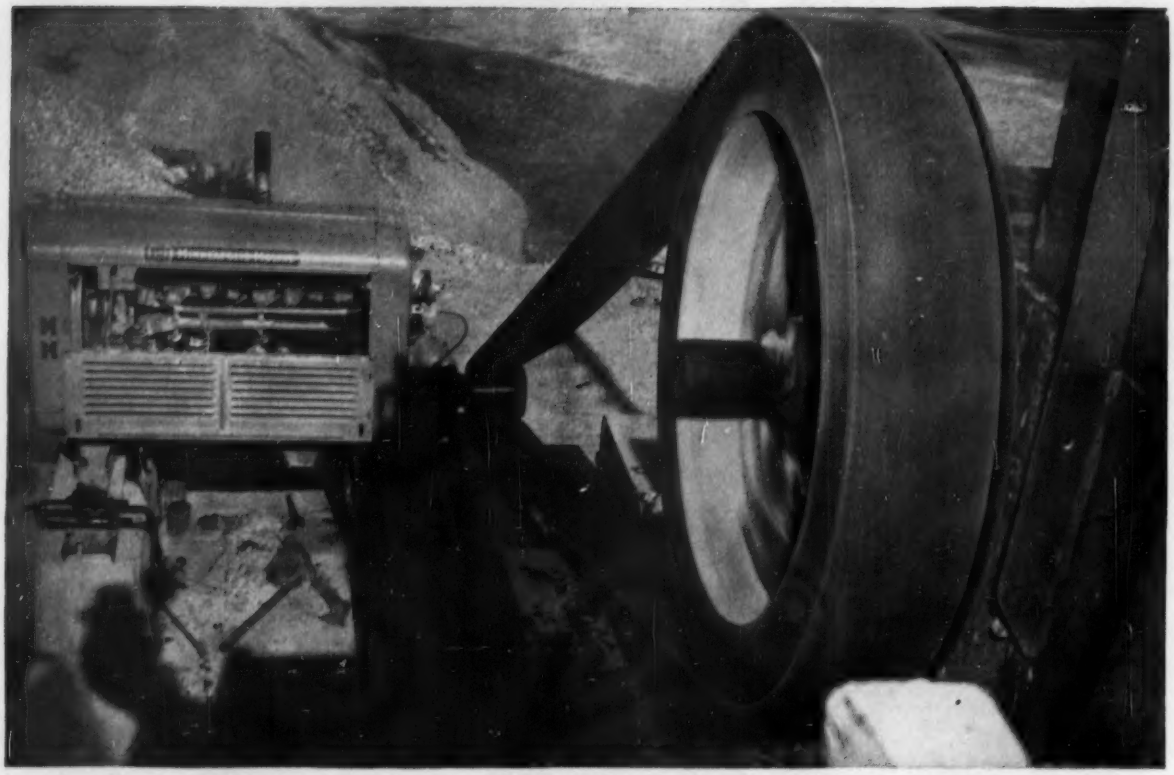
To drain the water for the three story, 180x202-ft building Crow had to pump the ground dry of water to a 30-ft depth.

Starting on one corner of the site, the contractor dug down about 6 ft. Twenty Moretrench wellpoints temporarily were sunk to drain water from the corner area to a depth of 10 ft. This permitted excavating to the operating level, roughly 12 ft below sidewalk grade.

As excavation proceeded, Crow jetted 18-ft deep wellpoints 6 ft apart around the perimeter of the building. A total of 180 wellpoints with more than 1,000 ft of 8-in. header pipe carried water to a 10-in., 2,600-gpm diesel-operated Moretrench vacuum-force pump for discharge.

The sub-cellar level which was to receive the 4-ft slab next was excavated. Concrete piles were driven to bed rock and capped. A waterproofing-protective slab followed. This was a 3-in. concrete slab followed by 4-ply membrane waterproofing topped with a 2-in. protective slab to receive the pressure slab.

This procedure was repeated on the cellar level. The pressure slab thickness there was reduced to 2 ft, due to lesser water pressure.

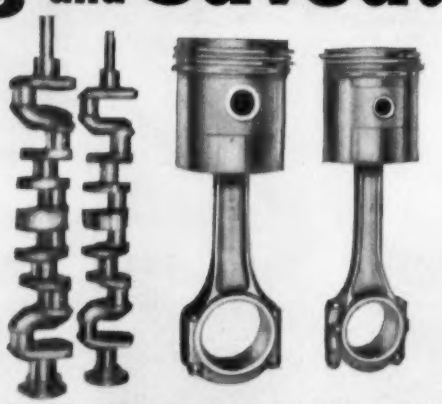


# These Crushing Plants Went Shopping and Saved!

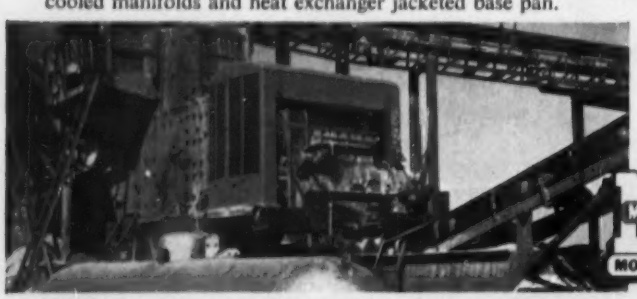
An MM 425-6A LP gas power unit best filled the requirements of this Illinois sand and gravel producer when he went looking for a heavy-duty engine to power roll and jaw crushers. His objective was to get

- **a factory equipped engine for lowest cost fuel**
- **low fuel consumption at maxium power and load**
- **minimum down time and maintenance**
- **convenience of installation and operation.**

The 425-6A more than filled the bill because MM engines are fully and separately designed for gasoline, LP gas, natural gas, diesel, or distillate—MM high turbulence combustion and ample displacement result in high torque at low rpm—long-run features like MM vacuum crankcase ventilation and improved oil filtering require less service—available equipment includes selection of power take-off drives, couplings, rotation and speeds—partial or full enclosures—radiator or cooling coil—choice of location for controls and instruments—electric starter and generator—water-cooled manifolds and heat exchanger jacketed base pan.



**Here is how MM part size goes up as displacement and hp go up to supply heavier construction necessary for continuous heavy load operation. Crankshaft, connecting rod, and piston of MM's 108 hp 605-6A engine are shown side by side with those of the next larger MM engine, the 148 hp 800-6A. Size and weight where it counts does the job longer and without strain.**



**Minneapolis-Moline engines are available from 29 hp to 291 hp, can be outfitted for specialized applications meeting all original equipment and replacement requirements within size ranges. Specifications and engineering service available on request.**

MINNEAPOLIS-MOLINE
MODERN MACHINERY

**MINNEAPOLIS-MOLINE**
**INDUSTRIAL DIVISION**
**MINNEAPOLIS 1, MINNESOTA**

*Fast, efficient Whiteman Power Buggies poured 33,000 yds. of concrete on bridge, running on movable platforms.*

*Double waters are hauled to front of forming operations on Whiteman flat-bed Power Buggies to speed job.*

*Here a Whiteman Power Buggy pulls a trailer load of reinforcing bars from supply depot on bridge to forming crews.*

*Portable runways were built ahead over mall to let Buggies deliver materials anywhere. Here a Buggy hauls a trailer.*

# *big bridge job proves* VERSATILITY *of Whiteman* POWER BUGGIES

Building New York's three-mile long, six lane Tappan Zee bridge in record time was possible to a large extent through the ingenious use of 14 Whiteman Power Buggies. These fast, rugged, tireless workers not only placed 33,000 yards of concrete, but proved their amazing versatility by also hauling lumber, forms, reinforcing steel, and innumerable other materials . . . keeping the job rolling at a speedy pace.

Consider the many material-handling jobs that Whiteman Power Buggies can do for you faster, more efficiently, more economically. Three body types for various needs. Or we will design a special body to meet your particular requirements. Call your Whiteman distributor or send coupon today.

*Joint general contractors for the deck work: Genaforms Construction Co., West Shore Concrete Co., and Euclid Contracting Corp. Whiteman Power Buggies supplied by Contractors Supply Corp. Photos courtesy Construction Methods & Equipment.*

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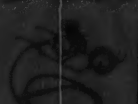
THE LEADER IN CONCRETE EQUIPMENT



POWER BUGGIES · SCREEDING MACHINES · FLOATING-FINISHING MACHINES

WHITEMAN MANUFACTURING CO., DEPT. C
3249 Casitas Ave., Los Angeles 39, Calif.

Please send prices, catalogs and name of distributor for
☐ Power Buggies ☐ Screeding Machines ☐ Vibrators
☐ Floating-Finishing Machines ☐ Truck Mixers.

Name _____

Firm _____

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City _____ Zone _____ State _____

# LOOK AT REO

## 122,000 MILES ... *then only a valve grind!*

TRUCKS, BUSES AND GOLD COMET ENGINES FOR ORIGINAL

**Mr. Lynn A. Schloss, Vice President, Ransome Company, Emeryville, Cal., reports, on Reo model F-22R:**

"We brought this unit into our shop when it had put on approximately 122,000 miles. We removed the head and found that all that was necessary was a valve grind. Now, some six months later, the unit has needed no further attention."

122,000 miles is actually small measure of the work performed by this Reo Gold Comet. It doesn't take into consideration the hours of work operating power take-offs, towing equipment and idling at hot, dusty, construction sites.

Your assurance that Reo, *the World's Toughest Truck*, will perform like this on your job is the famous Reo 100,000 mile or 1 year warranty on all Gold Comet engines. Call your Reo Factory Branch or Distributor and look at Reo before you buy your next truck.

**REO MOTORS, INC.**

LANSING 20, MICHIGAN • TORONTO, ONTARIO

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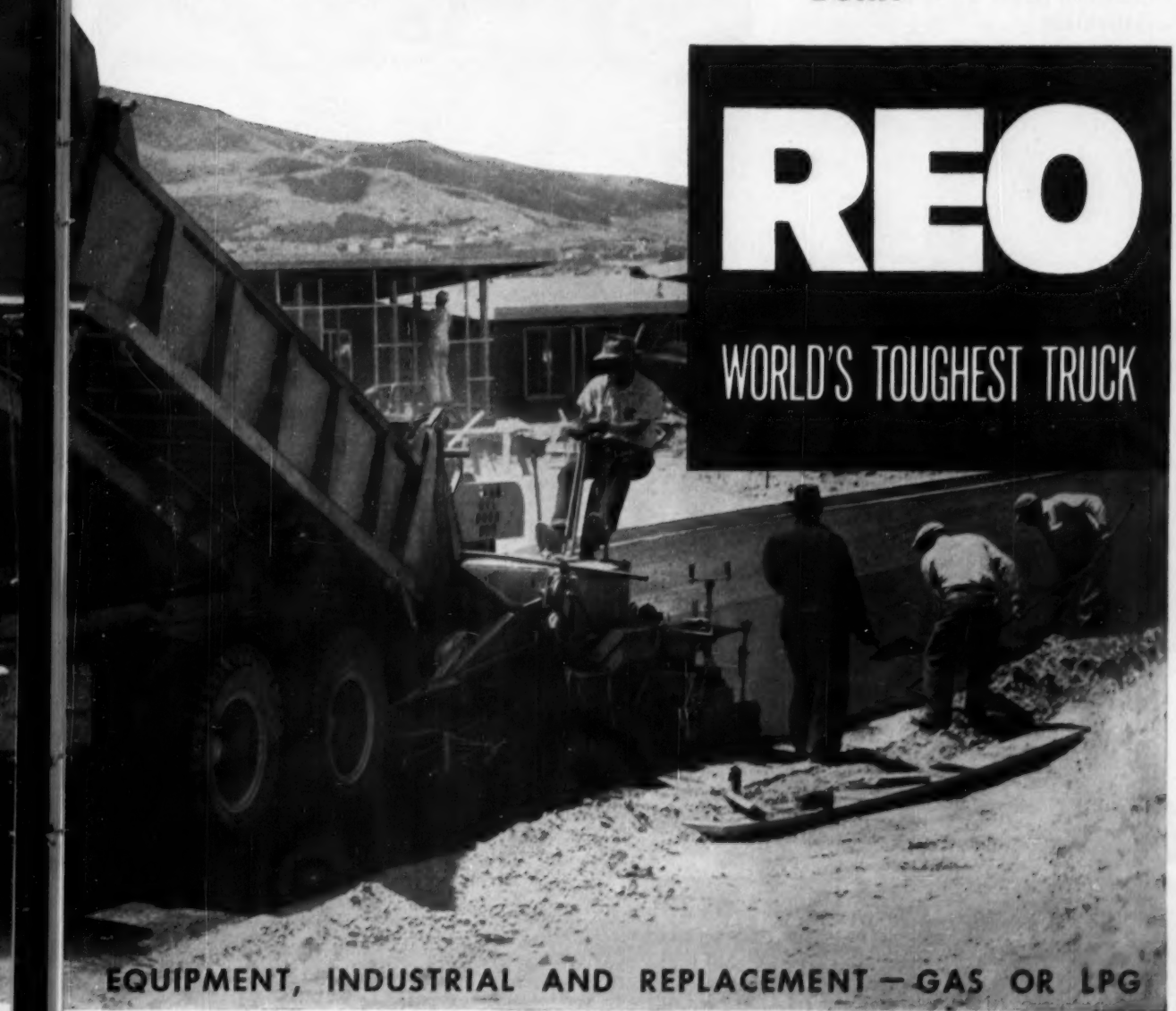

# You Can Do It Better With an Austin-Western Power Grader

Whatever the job . . . or season . . . or ground condition . . . it's CONTROLLED TRACTION (the exclusive combination of All-Wheel Drive and All-Wheel Steer) that licks 'em all.

On Austin-Western Power Graders there are no idling front wheels — no dead front end to consume power and decrease efficiency. Every pound is working weight — contributing 100 per cent to traction and delivering maximum power where it counts — at the blade.

Driving, steerable wheels at the rear, teamed up with the live climbing power of Austin-Western's famous front truck, provide flotation and tractive effort ordinary motor graders cannot hope to equal.

Spring and Summer, Fall and Winter, A-W Power Graders outperform all others . . . on all types of work, and under all conditions. Torque Converter Drive — available in all models — makes these . . .

**THE HOTTEST MOTOR GRADERS ON WHEELS**

## NOW THERE ARE FOUR *to meet your every need*

88-L

Super 88

99-L

Super 99

**Austin-Western**

Power Graders · Motor Sweepers
Road Rollers · Hydraulic Cranes

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Construction Equipment Division

*Manufactured by*
**AUSTIN-WESTERN COMPANY**
*Subsidiary of Baldwin-Lima-Hamilton Corporation*
**AURORA, ILLINOIS, U.S.A.**

## *A Construction Insurance Expert Tells...*

# How to Protect Your Job and Your Property

By EDWARD G. ARMITAGE
Partner, Armitage & Co.

*When is it safe to terminate an expensive Builder's Risk policy? Is your equipment satisfactorily protected at economical rates? In the last article of a three-part series written for CM&E, a construction insurance specialist tells you the coverages you need to protect you against losses resulting from damage to your own property and the property that becomes your responsibility when you start a project.*

BUILDER'S RISK insurance provides protection against losses resulting from fire damage to a project under construction. It is an important and necessary part of your insurance program and one which takes a good bite out of your insurance dollar. In many cases, a better understanding of its provisions can mean more effective protection at lower cost.

Builder's Risk usually is written on either of two fire insurance forms—the Reporting Form or the Completed Value Form. They provide the same degree of protection, but the method of premium payment differs.

The Reporting Form of Builder's Risk fire insurance requires you to notify the insurance company each month of your progress on the job. Your coverage then is extended to meet the work done in the previous month. The premium, therefore, starts low but mounts as the job progresses.

The Completed Value Form requires you to purchase coverage for the total value of the job at the time the policy is issued. But premiums are only 55% of the rate for Reporting Form premiums.

When choosing between the two available forms, the length of time it will take to complete a job determines which form is best for you. When the expected date of completion is more than two years from the start of the job, the Reporting Form usually will prove to be more economical. This holds true particularly when you do not expect to complete much of the work during the first year.

On the other hand, when you expect to finish a job within a two-year period, I would advise you to consider the Completed Value Form. Besides being cheaper for a short-term job, the Completed Value Form is desirable because of its simplicity. Unless the monthly progress reports required by the Reporting Form are kept up to date, you stand the risk of assuming part of the loss should a fire break out. This paper work is not required by the Completed Value Form.

Regardless of which form you use to obtain Builder's Risk coverage, check to see if the five-year installment plan is available in your state. The plan is simple in application, and there are no loopholes to worry about. The only requirement is that the policy must run at least a year. The first year of the policy you pay the premium you normally would pay. But each succeeding year that the policy is in operation you pay only 78% of the normal premium. Chances are the job won't take you five years to complete, of course. But when the job is finished and the policy terminated your premiums are pro-rated at the five-year rate,

*(Continued on page 92)*

**To reduce your insurance costs:**

Choose the right type of fire insurance.
Take advantage of the "five-year installment plan" when available.
Insure your equipment for a three-year period.
Insure your vehicles under an automatic fleet plan.

**Your coverage is incomplete when:**

Your name does not appear on the owner's Builder's Risk policy.
You fail to carry the Extended Coverage endorsement.
You guess at your risks, and buy "narrow" coverages.
You fail to guard adequately against dishonest employees.

**NEXT MONTH** | CM&E will print a comprehensive, easy-to-read check list of insurance coverages that apply to the construction industry.

EVER FLIP A RIG? An Equipment Floater policy can be written to cover the damage. Make sure it insures your rigs against "overturn, upset, derailment, collision, and fire."

and you pay only a small additional service charge. In states where the insurance boards allow the insurance companies to offer the installment plan, you can save a considerable amount of money.

**How Much Protection?**

Specifications usually require that a given amount of fire insurance be taken out on a job. In some cases, because the amount of coverage required seems substantial, contractors will purchase only the amount specified in the contract and neglect to add the so-called Extended Coverage endorsement to the policy. This endorsement is important because specifications usually make the contractor responsible for "all physical loss or damage" to the job.

Do not make the mistake of buying just enough insurance to meet the requirements of your contract. Whether or not the contract specifies that you must obtain coverages other than fire, you are responsible for practically all damage to a job.

Personally, I have handled many more claims for wind damage than for fire damage. Damage caused by wind or other perils that can be covered by an Extended Coverage endorsement may not be as spectacular as that caused by fire, but it occurs much more frequently and represents substantial amounts.

For an additional premium, you can purchase the Extended Coverage endorsement to give you good protection against the perils of wind storm, hail, explosion other than boiler, riot, civil commotion, aircraft, vehicles, and smoke. If you do not ordinarily purchase this protection, I strongly advise that you do so.

There are other very real dangers that are not covered by the basic Builder's Risk policy even when the Extended Coverage endorsement is included. Builder's Risk, for example, does not cover a job when it is partially occupied by the owner. Malicious mischief and vandalism also are excluded under the basic policy. Endorsement may be purchased to cover these risks. Earthquake insurance, too, might be a good investment for jobs on the West Coast.

When specifications say the owner will buy fire insurance to protect both the contractor and the owner, it is important to see that he also purchases the Extended Coverage endorsement. If the owner refuses to purchase this additional protection, offer to pay the increase in the premium. The protection is well worth the cost.

Another thing to remember when the owner purchases fire insurance is to see that your name is included among the insured. This is important because fire policies always contain a "right of subrogation" clause that gives the insurance company the right to sue under the insured's name to recover losses. If only the owner's name appears on the policy, and it can be shown that your operations caused a fire loss, the insurance company can pay the owner, then sue you to recapture the loss.

This works another way, too. Make sure that your subcontractors' names are included in your policy when you purchase fire insurance. Nobody wants a bankrupt subcontractor on his hands. The additional cost for this protection? Nothing at all.

Another word of caution: Do not make the mistake of purchasing insurance only when you are doing a building job. One of my own clients recently suffered damages in excess of $20,000 when a freak windstorm hit a large concrete viaduct that was about half completed. Fortunately, he was insured.

I also know of a contractor who suffered a loss when a car crashed into a concrete overpass that he was constructing. The car caught fire and a considerable amount of damage was done to the job. Unfortunately, he was not insured.

When insuring bridge, tunnel, and similar jobs, it is well to remember that they often can be covered with an "Inland Marine" form, usually at a lower premium rate than the Builder's Risk form. This type of insurance is particularly useful when a project requires working over navigable waters. The premiums may be lower, but this type of coverage has one big drawback: it usually is subject to substantial deductibles

VANDALISM AND MALICIOUS MISCHIEF can cause expensive damage such as this, but your insurance will protect you from loss if you take the trouble to get proper coverage.

# To the man who's thinking about buying a new truck:

## maybe you're missing something...

➢ And what you're missing is more than "maybe," it's for *sure*—if you haven't yet visited your Dodge truck dealer.

➢ Do you want to miss a *rock-bottom price?* Perhaps you haven't realized that Dodge trucks actually cost *less* than you'd pay for corresponding models of most other makes.

➢ Do you want to miss *power* so high it leads the field? Consider this: with engines of 169 to 175 horsepower, Dodge overpowers *every other leading make of truck* in the low- and medium-tonnage fields.

➢ Surely you don't want to miss the many advantages of "*Job-Rated.*" Because all units from engine to rear axle are engineered and matched for a specific job, the Dodge truck you buy is exactly *right* for your business.

➢ You don't want to miss Dodge safety—which includes the biggest wrap-around windshield of any truck on the road, the shortest turning radius. Or Dodge superior cab comfort . . . Forward Look Styling.

➢ In short, you get a whale of a lot more truck for a good deal less money than you think! Stop in and see your Dodge truck dealer right away—don't miss *anything!*

**DODGE** Job-Rated **TRUCKS**

WITH THE *FORWARD LOOK* ➢

**ADEQUATE INSURANCE . . .**

Continued from page 92

before the insurance company assumes the loss.

When you are making your prebid investigations, be sure that you carefully check the job location and also the type of construction that the specifications require. Fire rates vary substantially, depending on the type of construction and whether the work is to be done in a "protected" or an "unprotected" area. Insurance companies have set up minimum distances between the job site and fire stations and plugs within which a job has to be located if it is to be considered "protected."

Since the cost may be a good deal more for construction in non-protected areas, you had better know the exact whereabouts of fire fighting equipment in relation to the job before you submit your bid figure. The premium for a frame building being constructed in a "non-protected" area will be a great deal more than the premium for a fire-proof job carried on in a "protected" area.

How long should Builder's Risk and its endorsements be carried? Since premiums for this coverage can run to a substantial figure, it is, of course, important that your insurance is terminated as soon as possible. But the question arises: When does your responsibility cease? Unless the contract states otherwise, the courts have held in almost every instance that a construction job is fully accepted by the owner only when he has presented a valid certificate of acceptance. This has nothing to do with the day the contractor removes his equipment, or when the owner occupies the premises.

I recently was requested to terminate $11 million of fire insurance on a large manufacturing plant because the contractor felt that, since the plant was in operation, the owner had taken over control. Since no formal statement of acceptance had been received by the contractor, I advised against cancelling the policy, although the premiums were admittedly large. Attorneys for the contractor concurred because the specifications held the contractor responsible for "all physical loss or damage."

Two months later a hurricane caused almost $200,000 damage to the plant. Attorneys for the owner immediately demanded restitution under the terms of his agreement with the contractor. The contractor's insurance company paid the full amount of the damage.

The moral here is that insurance should never be cancelled until you are absolutely sure that your liability has ceased. This axiom should apply not only to Builder's Risk, but to any insurance you must carry.

**Protecting Your Property**

I have been discussing the insurance you carry to protect against damage to property which becomes your responsibility when you sign a contract to do a job. Usually, it is not your property. Nevertheless, specifications may require you to accept responsibility.

It will not be necessary to remind you of your investment in your own equipment. It is enormous and your need for bigger machinery is growing constantly. Equipment also is becoming increasingly portable, and when it is moved around the damage risk increases.

Most contractors cover their off-

*(Continued on page 96)*

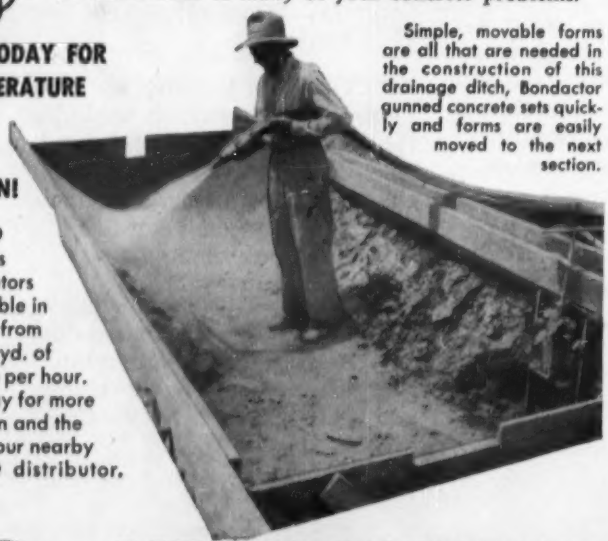

**Modern Methods Make the Difference . . . and AIRPLACO CONCRETE GUNNING EQUIPMENT IS MODERN!**

Put the AIRPLACO Bondactor or Nucretor to work on your next concrete job and see the difference! Here is truly advanced design equipment that out-performs all other methods for placing concrete. AIRPLACO gunning equipment efficiently guns concrete, refractory linings, castable refractories and all other gunnable aggregates.

The saving in form construction alone, will be enough to convince you that gunning concrete the AIRPLACO way, is the only way!

You'll find that your Bondactor or Nucretor will be the answer to *many* of your concrete problems.

**WRITE TODAY FOR FREE LITERATURE AND FULL INFORMATION!**



Simple, movable forms are all that are needed in the construction of this drainage ditch, Bondactor gunned concrete sets quickly and forms are easily moved to the next section.

AIRPLACO Bondactors and Nucretors are available in capacities from ½ to 6 cu. yd. of aggregate per hour. Write today for more information and the name of your nearby AIRPLACO distributor.

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MANUFACTURERS OF ADVANCED DESIGN CONCRETE GUNNING EQUIPMENT

# The New UNIT Model 510 *Challenger* ... as a Trenchoe

## DESIGNED with a BACKGROUND of 3/8 YARD EXPERIENCE

Evidence of highest quality engineering and construction includes alloy steels and forgings • anti-friction bearings • modern transmission design with involute splines to add strength and reduce wear • straight-in-line engine mounting with torque converter • trunnion supported tapered drums to eliminate bending stress on drive shafts • easily accessible hydraulic clutches • minimum number of main machinery gears enclosed in one-piece cast gear case • force feed lubrication • self-aligning replaceable hook shoes distribute applied pressure over maximum area • interchangeability of parts simplifies maintenance, cuts costs. All these UNIT advantages mean more profitable operations for you.

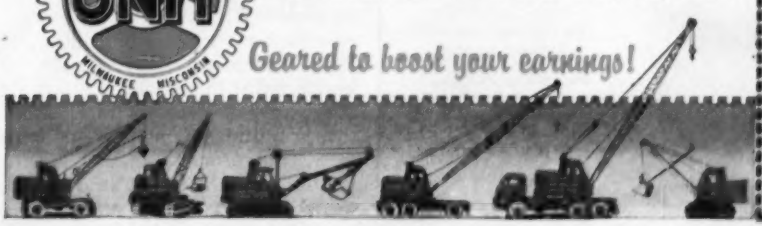
## *Why it's* BEST *to* INVEST *in modern* UNIT *models*

Because each feature has been proven to contribute substantially to the Life, Performance and Efficiency which have made present and previous UNIT products readily acceptable.

*Send for Bulletin Now... Use Coupon!*

UNIT CRANE & SHOVEL CORP.
6305 W. Burnham St. • Milwaukee 14, Wis., U.S.A.

*Geared to boost your earnings!*



UNIT CRANE & SHOVEL CORP.
Milwaukee 14, Wisconsin

Please send me your new Bulletin on the UNIT CHALLENGER Model 510.

Name.....

Address.....

City.....

State.....

# "Sherman Loader Best Unit in the Business"

Stanley Lindholm, subcontractor from Welch, Minnesota, has many enthusiastic comments to make about his Sherman AJ-25 Front End Loader. When he decided to buy a loader for his Fordson Major Tractor, he looked at just about every model available. He saw them demonstrated, checked the specifications of each and compared the prices. "After all the checking I did", said Mr. Lindholm, "there was only one decision I could make — to buy the Sherman Loader. Since then I have used it on all kinds of jobs and can say quite frankly that for the type of work I do, it is the best unit in the business."

As a subcontractor, Mr. Lindholm is called out on all kinds of jobs, each with its own particular problems. He works very closely with many of the contractors in his area and most of his work is done for Ed Axelson, a plumber from the nearby town of Hastings. He digs basements, footings, and pipelines with his Sherman Digger and uses the Front End Loader for backfilling, (see photo above) and loading dirt and gravel in the trucks.

Mr. Lindholm is but one of the many contractors who are finding that the Sherman Digger-Loader combination is the most economical and productive unit in the business. Two Loader models are available . . . up to 2500 pounds bucket and 4500 pounds breakaway capacities. Sherman Loaders and Diggers are both sold and serviced locally by your Ford Tractor Dealer. See him today for a demonstration or write for free Bulletin No. 833.

Sherman

PRODUCTS, INC.

ROYAL OAK, MICHIGAN

POWER DIGGERS • FRONT END LOADERS* • FORK LIFTS

*Manufactured Exclusively for Sherman Products, Inc. by Johnson Hydraulic Equipment Co., Minneapolis, Minn.

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## ADEQUATE INSURANCE . . .

Continued from page 94

the-road equipment with an Equipment Floater policy. This can be purchased either as a broad all-risk form or for named perils. Naturally, it is cheaper to try and name your risks, but it also is a hazardous practice.

The broad, all-risk Equipment Floater policy will give you good blanket protection against "all physical loss or damage caused by external means" while your equipment is in the yard, on the job, or being transported. Of course, an Equipment Floater policy is not responsible for mechanical failures.

An Equipment Floater is not made out on a standard form, so it is possible to get your policy tailored to meet your needs. But, be sure to check the wording. About 75% of the claims that I handle are caused by equipment upsetting or overturning. Be sure that your policy covers "overturn, upset, derailment, collision, and fire." In addition to covering equipment you own, be sure that the policy also specifically covers equipment "rented, used, and for which the insured is legally responsible."

When you are renewing your Equipment Floater policy, ask the underwriter to quote you a price for a three-year policy. It usually is possible to obtain a three-year policy for only 2½ times the annual rate.

Licensed vehicles that normally use highways cannot be covered under an Equipment Foater policy. Therefore, you must purchase vehicle policies for trucks or autos.

Most contractors with at least five vehicles use the fleet plan to cover their trucks and autos. A blanket policy can include protection against bodily injury or property damage liability, fire, and theft. Collision insurance is not included and must be purchased specifically for each vehicle. The fleet plan is practical for two important reasons: (1) It results in a lower rate per vehicle, and (2) it automatically covers new vehicles you may buy later.

The fleet plan plus collision insurance will cover most contingencies, but there are two additional endorsements that should be purchased if the situation warrants the additional protection. First, there is a non-ownership endorsement that protects against actions arising from the use of automobiles owned by your employees but used

on your business. Secondly, the hired car endorsement covers both hired trucks and passenger cars.

**Employee Dishonesty**

The last classification I am going to discuss is of prime importance. Most contractors assume a certain amount of employee dishonesty is expected. But I wonder how many realize that employee dishonesty losses have for some time exceeded our national fire losses.

Fidelity insurance, or dishonesty insurance as it is sometimes called, protects you against such losses. Coverage may be bought on specific persons or positions, but the ideal coverage is the blanket bond form that automatically covers all employees without prior notice to the insurance company. The general practice has been to bond a bookkeeper and a few key men. But insurance files prove that you cannot "pick" the man who will be dishonest. There is another important reason for buying Fidelity insurance under the blanket form. With this form, you merely indicate that the theft was committed by "employee or employees unknown." On other forms you must name the individual, and unless there is enough definite proof to indict the employee, you face the danger of defamation of character or false arrest actions.

**Must Work Together**

My 22 years of experience as a construction insurance broker have taught me that the average contractor often is confused about many aspects of his expensive insurance coverages. In this article, I have attempted a general discussion of some complexities.

I have covered only those insurance problems which are unique to the industry. I have not discussed, for instance, the so-called "front office" coverages (contractor's buildings, money, etc.) that apply to almost any type of business as well as construction.

Your broker is an insurance specialist with a good working knowledge of the construction field. He can obtain for you the protection your operations require, but to do this he needs your cooperation. Take him into your confidence. He cannot be expected to serve you to the best advantage if he is not kept informed of your operations. It is when the contractor and the broker work as a team that they work best. That is the way to get better coverage at lower cost.

**Tough Contract Completed—Thanks to a Sherman Power Digger!**

Mr. K. M. Johns, earthmoving contractor from Westminster, South Carolina, was in trouble. After contracting with a neighboring city to lay an eight inch supplementary water line through the center of town, he discovered that his excavating equipment was too large and unwieldy to work between curb and sidewalk. To use such machinery would have meant re-routing traffic along the entire route at great extra expense to the city.

Mr. Johns' problem was solved by the purchase of a Sherman Power Digger. Mounted on a Ford Tractor, the unit maneuvered easily between curb and sidewalk and the job was completed on time and at a profit.

Sherman Power Diggers are earning an enviable reputation among contractors for versatility, compactness and maneuverability. They dig faster . . . up to ten feet below grade in mud, hardpan, shale, blacktop, and stony ground. Sherman Diggers are sold and serviced locally by your Ford Tractor Dealer. See him today for a demonstration or write for free Bulletin No. 831.

*Designed, Engineered and Manufactured Jointly by Sherman Products, Inc., Royal Oak, Michigan. Wain-Roy Corporation, Hubbardston, Mass.

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Patent No. 2-303-852
Other Patents Pending

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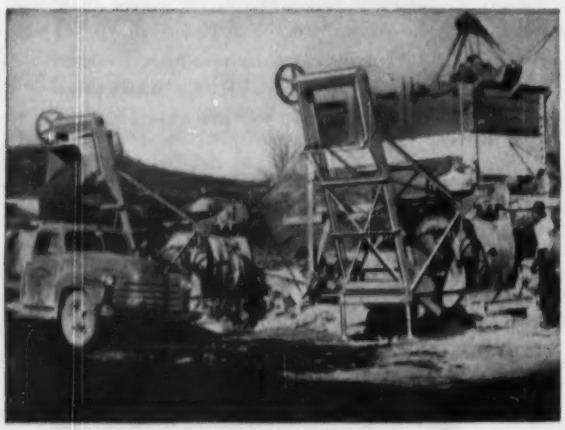
POWER DIGGERS* • FRONT END LOADERS • FORK LIFTS

KWIK-MIX 16-S DANDIE®

***handiest mixer you've ever seen***

**LOADS TRUCKS** — Producing concrete for curbs and gutters, a Kwik-Mix 16-S Dandie mixer dumps batch directly into truck from ground level. Tower loader attachment gives 9 foot-2 inch discharge height. Big-capacity bucket holds full 17.6 cu. ft. mixer batch. It is powered by the mixer engine, dumps automatically at top of tower. Bucket travel and discharge are completed while the next batch is being

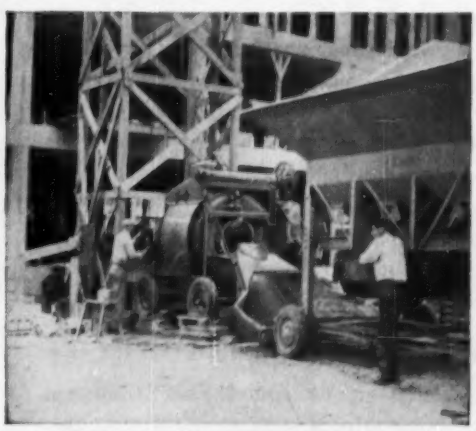


**SETS UP AS CENTRAL-MIX PLANT** — on bridge construction, two Kwik-Mix 16-S Dandie concrete mixers, with wheels removed, were set up side-by-side as permanent mix plants. Both were equipped with tower attachment for truck-loading operation. These big-capacity mixers also can be set up as stationary plants on elevated platforms by adding an extension track to charge the drum.

**LOADS CONCRETE BUCKETS** — Working on a state highway relocation project, this mobile 16-S Dandie mixed concrete for a series of box culverts — discharged batch into concrete bucket. To suit operating conditions, this versatile Kwik-Mix 16-S mixer is adaptable to side or end discharge. Axles are readily interchangeable on the square mixer frame. Change-over is easy, takes less than an hour.

**KWIK-MIX COMPANY, Port Washington, Wis.** (Koehring Subsidiary)

mixed. There's no delay to mixer production. Tower is easily attached. Top section is hinged, folds back for ample travel clearance. Tower loader attachment is also available on the 11-S Dandie concrete mixer, and on Kwik-Mix 10 and 14 cu. ft. bituminous mixers.



**TEAMS UP WITH BATCHER** — Concrete for a new apartment building was produced on the job by this Kwik-Mix 16-S mixer and Johnson Lo-Bin batcher — a low-cost, big-production team. (Other sizes in Kwik-Mix line include: 11-S, 6-S, 3½-S Dandie mixers.)

*Also: Plaster-mortar mixers, bituminous mixers, Mate-Bags®*

## Johnson ⅜ to 3-yard Clamshell Buckets

Smooth inside and out, Johnson all-welded clamshells dig and dump with less resistance . . . give fast clean discharge. They're quick-filling, easy-closing, because big needle bearing-mounted sheaves reduce friction loss, deliver full digging power to cutting edge. Hard manganese edge, welded to heavy lips, toughens with use. 3 types, 10 sizes: ⅜ to 3 yds. Also check Johnson line of concrete plants, bins, batchers, hoppers, silos.

**C. S. JOHNSON • Champaign, Ill.**
***(Koehring Subsidiary)***

## NEW 155 Trenchliner® is low and narrow

Small and compact, the working height on Parsons new 155 Trenchliner is only 7 feet-4 inches. Width over crawlers 5 feet-4 inches for work and travel in crowded areas. It digs up to 25 feet per minute — 16 to 26 inches wide, at depths to 8 feet. Has down-crowd boom, hydraulic control, "Tap-In" teeth, power-shift spoil conveyor. Available on flat shoes or grouser-type treads. Also — 4 other Parsons models, all sizes, types.

**PARSONS • Newton, Iowa**
***(Koehring Subsidiary)***

## 20-ton capacity with Koehring 405 Crane

With one of these heavy-duty 405's, you're equipped to lift any load up to 20 tons. Boom lengths range from 40 to 90 feet. For added reach, 15 to 30-foot jib can be used on any length boom up to 80 ft. Extra lift-capacity and stability increases the 405's work capacity with all attachments. Converts to 1-yard shovel or hoe, handles 1 to 1½-yard clamshell or dragline buckets on wide work radius. 4 other Koehring sizes also available.

**KOEHRING Company**
**Milwaukee 16, Wisconsin**

V64

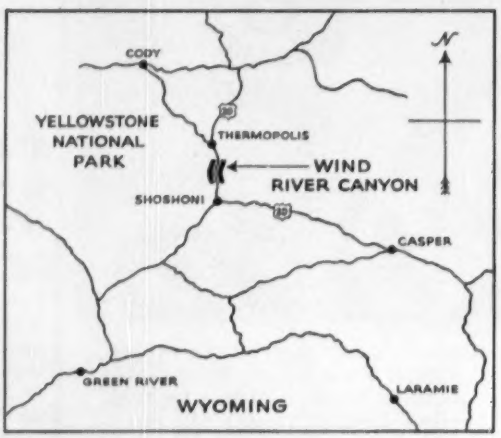
(Advertisement)

*'I've never hit a tougher rock job in my 28 years in these mountains'*

DAN RATLIFF, *Superintendent for the Wind River Project Contractors, the* INLAND CONSTRUCTION COMPANY

# ATLAS COPCO DRILLS DRIVE THROUGH SOLID ROCK ON WIND RIVER CANYON HIGHWAY, WYOMING

Wind River Canyon is eleven miles long; a principal route to the Yellowstone National Park. Cut out of the precipitous canyon walls over six-thousand feet high is a railroad and a twenty-year-old highway packed with tourist traffic during summer. To ease congestion and to eliminate danger spots on the highway, Wyoming's State Highway Department decided to carry out extensive modifications.




## ATLAS COPCO BREAK NEW GROUND

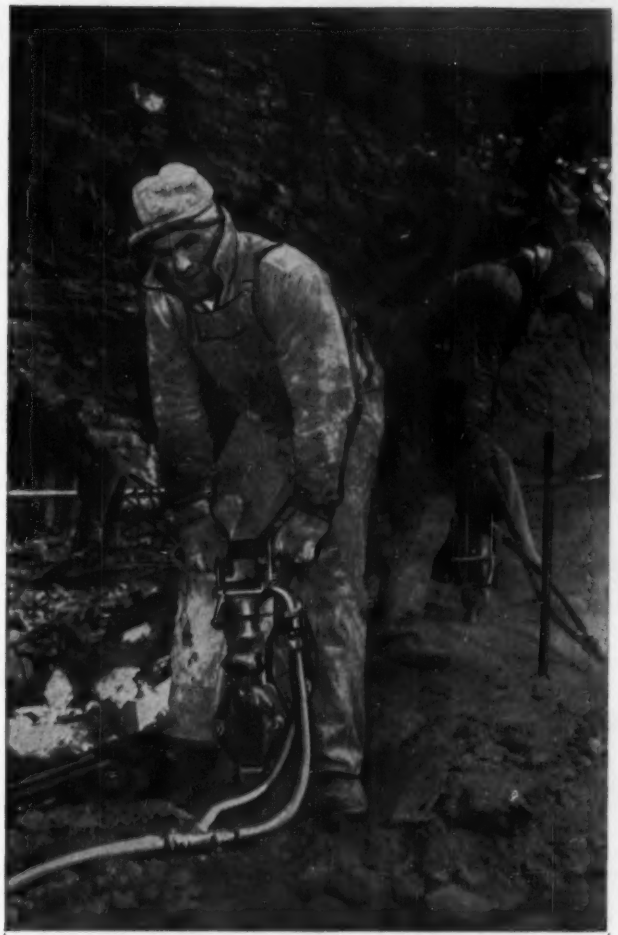
Rock work was a major part of the project, with 200,000 cubic yards excavated for dumping. The maximum cuts, 1,000 feet long, 95 feet deep and 60 feet wide, were in areas of solid rock; a conglomerate of diorite, red granite and badly fissued sandstone and limestone. This was the type of ground once kept for the heavy wagon drill. The Inland Construction Company drew on past experience, swept aside convention and chose Atlas Copco light, *one-man* rock drills and Sandvik Coromant integral steels to do the job instead. Their choice gave them rock-drilling equipment costing at least fifty per cent less! The drills and steels were supplied by Copco Pacific Ltd. In spite of solid rock, below-zero temperatures and restricting blasting requirements, Atlas Copco drills and Sandvik Coromant steels once again showed themselves to be the world's leading drilling combination. Their fine performance in Wind River Canyon is indicated in the low figure of 1.15 feet of drilling for each excavated cubic yard of rock. Low powder costs reported from Wind River Canyon can be attributed to the small bit diameter of Sandvik Coromant steels.

## UNBEATABLE DRILLING UNIT

Atlas Copco light rock drills and Sandvik Coromant tungsten-carbide-tipped steels started a revolution in the drilling field when introduced some ten years ago. Closely developed together, they make an unbeatable unit.

The Atlas Copco light, one-man rock drill itself is a versatile machine. On Wind River Canyon they were used for benching. With the addition of a pusher leg, any one of them could have been adapted for tunnelling *in minutes.*

(Advertisement)



*Two Atlas Copco light rock drills, in operation in Wind River Canyon. Fifteen of these drills excavated 200,000 cubic yards of rock. All were fitted with Sandvik Coromant tungsten-carbide-tipped steels.*

## EXTRA-TOUGH COROMANT STEELS

Sandvik Coromant steels are extra-tough! You can be sure of a quality that never varies. This is because Sandvik control every phase of production—from the mining of iron ore, processing of wolfram ore to the final tungsten-carbide tips used throughout the world wherever Atlas Copco drills are in action. Wind River Canyon project is another example of how this outstanding combination can bring *new* speeds and *new* economies to drilling—*even under the toughest conditions.*

Atlas Copco Compressed Air Equipment is manufactured or sold and serviced in 50 countries throughout the world by *The Atlas Copco Group*, which embraces companies trading under various names such as Atlas, Atlas Diesel, Atlas Polar, Atlas Copco, Copco, Delfos and Sampa.

*This Atlas Copco portable grinder was able to service drills on the site; saved drilling delays and overtime costs.*

**MAIL THIS COUPON** *to the most convenient of the addresses given here:*

**U.S.A., Copco Pacific, Ltd., 930 Brittan Avenue, San Carlos, California; Copco Eastern, Ltd., P.O. Box 2568, Paterson 2, N.J.; CANADA, Canadian Copco, Ltd., Montreal, A.M.F., P.Q.;** MEXICO, Atlas Copco Mexicana, S.A., Apartado Postal 56, Torreon, Coahuila; PERU, Atlas Copco Peruana S.A., Apartado 2982, Lima. UNITED KINGDOM, The Atlas Diesel Co. Ltd., Wembley, Middx.; FRANCE, Atlas Polar S.A., 29, Rue Marbeuf, Paris 8e; HOLLAND, N.V. Holland-Atlas, P.O. Box 6056, Rotterdam; ITALY, S.A.M.P.A., Viale Marche 15, Milan.
AUSTRALIA, Australian Atlas Company Pty., Limited, P.O. Box 54, Auburn, N.S.W.; SOUTH AFRICA, Delfos Pty. Ltd., P.O. Box 504, Benoni, Transvaal.

*Readers in countries outside those listed above and who do not know the name of their local Atlas Copco company or agent, please write, in the first instance, to AB Atlas Diesel, Stockholm 1, Sweden.*

*Please forward details of* ***Atlas Copco Rock Drills and Sandvik Coromant Drill Steels***

NAME .....

COMPANY .....

ADDRESS .....

.....

*I am also interested in other Atlas Copco equipment (Please state which below)

..... 42/6

**Manufacturers of Stationary & Portable Compressors, Rock-Drilling Equipment, Loaders, Pneumatic Tools & Paint-Spraying Equipment*

THE ATLAS COPCO GROUP OF COMPANIES

# NOW Model RD15 Movall, with Positive Ejection, Controlled Spread, for Cat DW15

This rugged wagon hauls 16 heaped yards (12 struck or 22 tons). It works off standard Caterpillar controls, has "dozer-type" ejector that gets rid of loads with a positive, 140,000-lb. push.

Like larger Movall, the Model RD15 can dump at controlled rate into grizzlies or hoppers.

**NEW C & D MOVALL MODEL RD15** for hauling rock, dirt, mud or any other top loaded material is designed especially for Caterpillar DW15 Tractors, both new and old; under favorable working conditions it also can be used with Cat DW10 Tractors. Like the larger, job-proved 25-yard Movall, the Model RD15 operates off standard Caterpillar controls, works interchangeably with scrapers, is simple and easy to operate. There's nothing new to learn.

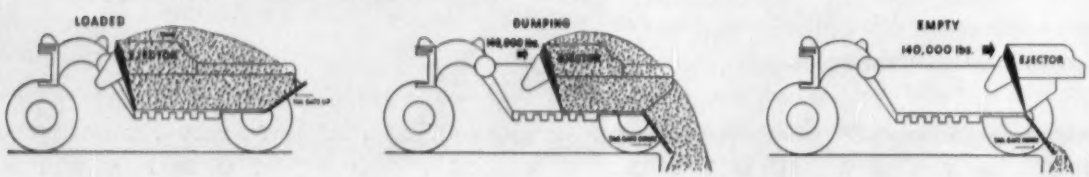
**"DOZER-TYPE" EJECTOR PUSHES LOADS OUT QUICKLY**—with a powerful, positive force of 140,000 pounds. This cleans the haul unit completely whether you're hauling dirt, rock, mud, gumbo, or frozen ore. There's no build-up or double hauling of sticky material, or time wasted cleaning. The "scraper-in-reverse" design, available only on C & D Movalls, also allows you to place the load anywhere and in any manner you want: over the edge of fill; spread in even lifts of any desired depth; or dumped into hoppers at a controlled rate.

**HANDLES ANY MATERIAL YOU CAN TOP LOAD** with a shovel, drag line, or belt. You have a large loading target of 10' x 16' and short turning width of 27'. You get capacity loads every trip—tailgate minimizes spillage while loading, and during haul. Heaping loads are ejected over a fill in only 11 seconds.

**ASK YOUR CATERPILLAR-C & D DISTRIBUTOR FOR A DEMONSTRATION** on your job. Find out what a C & D Movall can do for you. Call him NOW or write direct to C & D Manufacturing Co., Perkins (near Sacramento), California. Phone HIllcrest 5-8592.

**HOW IT WORKS**—Movall uses standard cable scraper power control. To dump, operator releases backhaul drum to drop tailgate, engages ejector drum. Eight-part ejector line gives 140,000 lb. push to boost load out fast and clean. Operator has complete control of discharge, controls spread depth by varying travel speed. After dumping, backhaul line closes tailgate and rolls ejector to loading position.

7



# One Grease One Gun

## ...that's all you need!

Simplify maintenance, and do a better job of it too! That's what you want, and that's what you accomplish when you switch to Sinclair LITHOLINE® Multi-Purpose Grease. This all-purpose lubricant enables you to cut service time to a minimum, and get lasting protection for all bearings and fittings. At all temperatures it's easy to use. Moreover, your grease jobs last longer because LITHOLINE resists water-washout, doesn't thin in summer heat, and won't oxidize and cake in bearing crevices.

What more could you ask than a proven "one grease – one gun" system of superior lubrication? There's less wear, no wasted time, and you save money. Call a local Sinclair Representative today for full information, or write for the new LITHOLINE pamphlet to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

# SINCLAIR LITHOLINE

## Multi-Purpose Grease

# Can you tell which Gear will deliver Trouble-Free Service?

## MAYBE YOU CAN'T...BUT YOUR BUDA ENGINE CAN!

Two replacement crankshaft gears may *look* alike—but when one of them is a genuine Buda replacement part and the other a "will-fit"—there's a powerful difference! The Buda gear will be the *exact* part your particular engine requires . . . it will be made to carefully controlled tolerances and of material specifically developed to meet our standards. Once it's installed you'll know the difference, because your engine will operate at maximum efficiency and *continue* to deliver profitable horsepower hours for years to come.

Any replacement part—whether it's a gear, filter, a piston, set of rings, or a gasket—will give you the performance and service life you expect if it's a genuine Buda part. Be sure the parts installed in your Buda engines are genuine Buda parts . . . it pays in the long run.

**Close-up photo of a "will-fit" crankshaft gear after 2000 hours of operation. Tooth surfaces and shoulders worn so badly that replacement was necessary.**

**This Buda crankshaft gear, taken from an engine after 3000 hours of operation, shows no appreciable wear, and could be re-installed in the engine.**

**See your nearby Buda Division Engine Distributor for any Buda replacement part you need. His stocks are complete and ready for immediate delivery.**

**BUDA DIVISION • HARVEY, ILLINOIS**

# ALLIS-CHALMERS

BC-35

**Bridge superintendent Bill King grabs his camera and shoots . . .**

# Photos That Save Time, Trouble, Expense

WHAT HE SHOT was picture of out-of-line piles put in by subcontractor. Sub can't argue against this picture proof.

MOST CONTRACTORS arrange to get pictures of their jobs during construction, but not all of them go in for photography so systematically as Bayer & Mingolla Construction Co., Inc., of Worcester, Mass.

To this firm, its cameras are almost as important as other tools on the job. It regularly uses six Polaroid cameras—a special type that develops its own film within 60 sec—for a wide range of practical purposes:

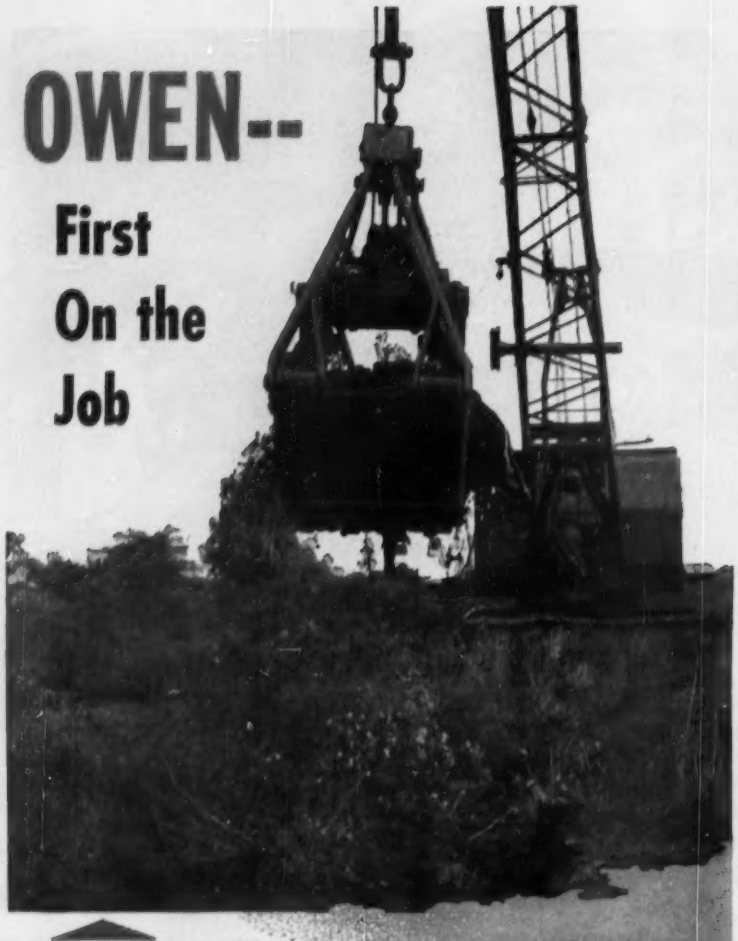
- To support insurance claims.
- To illustrate progress reports.
- To show material is damaged on arrival.
- To prove installation of elements not visible when a structure is completed.
- To support bid preparation surveys.

A flock of photos from the field flows into the Bayer & Mingolla home office every day. They help keep the top men posted on everything of importance that happens on jobs busy executives seldom get time to visit. Company officials say the photos save them time, trouble, and expense. And they cite examples.

Bridge superintendent Bill King tells how he sent in photos to prove that a subcontractor had driven several 14-in. piles for a bridge abutment out-of-line. He estimated that every two piles 9 in. out-of-line would require an additional 15 cu yd of concrete encasement at a cost of $30 per cu yd.

"Somebody had to pay for the extra material," he said, "and I had the picture to show it wouldn't be us."

Another time King showed a picture of the inscription on a bridge end-post to a stone cutter. When he mentioned the cost of the inscription, the cutter




An Owen bucket takes the first bite for National Engineering & Contracting Company on the 55th Street intersection of Cleveland, Ohio's multi-million dollar freeway.

One of their many Owen buckets breaks ground for the Horwitz Co. of Cleveland, Ohio at the opening ceremonies of Ohio's 241 mile, 326 million dollar turnpike at Peninsula, Ohio.

"A mouthful at every bite"

Yes, Owen buckets are first on the job — and first in demand for those who want greater digging power, quicker opening action, and more rugged construction.

*Write today for free illustrated catalog.*

THE OWEN BUCKET CO.

6020 Breakwater Avenue · Cleveland 2, Ohio

Branches: New York Philadelphia Chicago Berkeley Calif. Fort Lauderdale Fla.


**PHOTOS SAVE TIME . . .**
**Continued**

offered to do a similar job $500 cheaper. So Bayer & Mingolla now save $500 for this work.

Field superintendent Duncan Munro says he always takes a camera with him when he goes out to estimate a job. "I can explain better and back up my personal estimates by showing the pictures," he said.

Office manager Thomas F. Murphy cites an example of how photographs helped avoid payment of an insurance claim against the firm. It was a road repair job, and the contractor had posted big "Road Closed" and "No Parking" signs. But one motorist ignored the signs and parked within the construction area.

**Prove it with Pix**

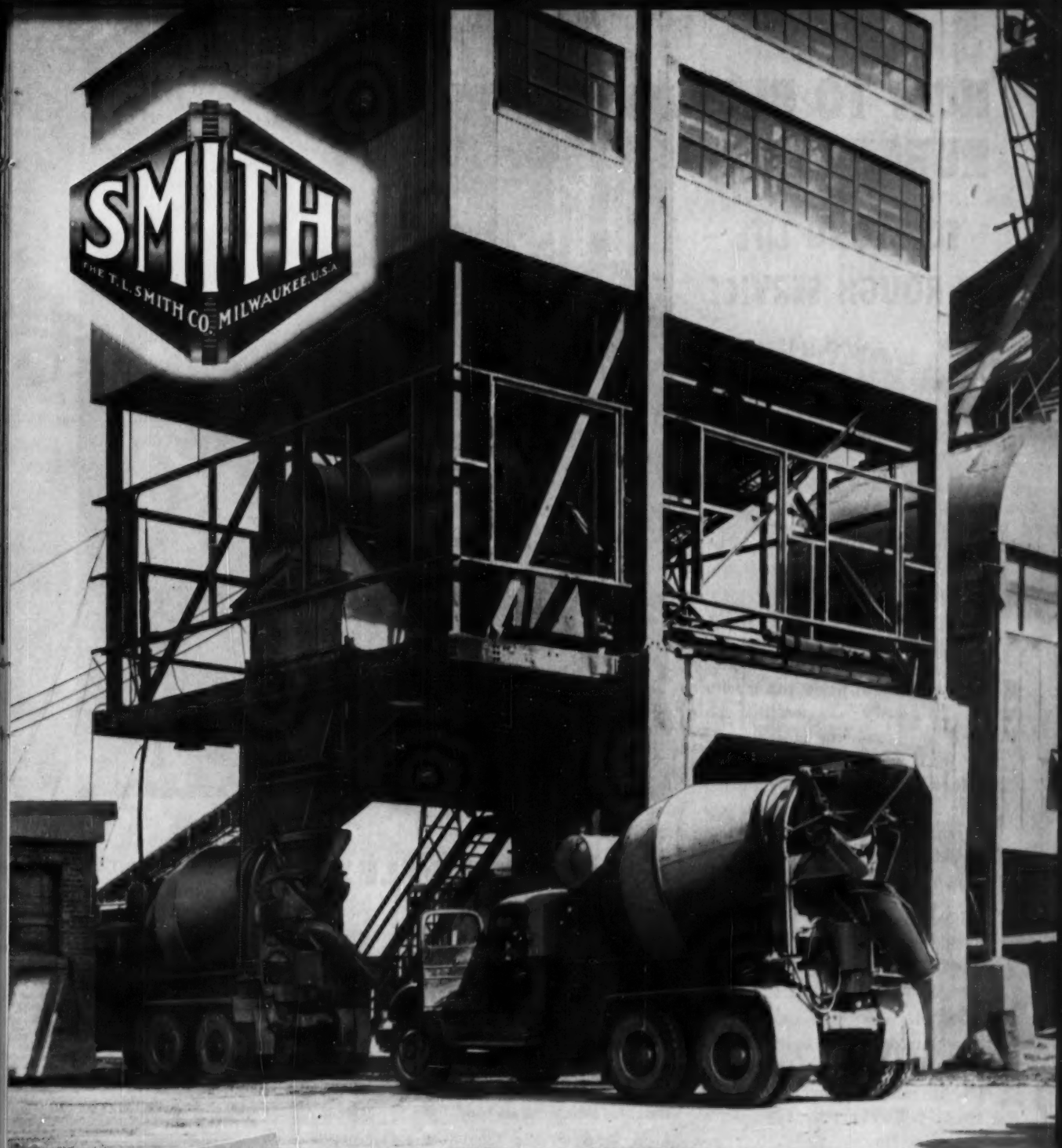
"When our grader accidentally hit the car," Murphy said, 'one of our men grabbed a camera right away and snapped a couple of pictures from an angle showing the car on the wrong side of the signs. The pictures proved the car was parked within the construction area."

Bayer & Mingolla use the Polaroid camera because it develops the film and makes a print for each shot within 60 sec after the exposure is made. The firm's amateur photographers can be sure their pictures show what they want shown. And the pictures can be on their way back to the home office without delay.

* * *

## A Handy Helper On Concrete Jobs

If you do concrete work, you will find CM&E's new booklet, Concrete Mixing and Placing, an invaluable help. It consists of a series of 13 articles written by specialists for CM&E and reprinted in booklet form for your convenience. It contains a wealth of information on the latest, money-saving techniques for all types of concrete work. Single copies cost only 50¢; for orders of 10 copies or more, the price is 40¢ each. Address your order to: Editor, Construction Methods and Equipment, 330 W. 42nd St., New York 36, N. Y.




# SMITH Gives You BOTH TILTERS and AGITATORS

"Quality Concrete" becomes more than a slogan when you use Smith Tilters and Smith Agitators. *BOTH* these machines are designed to give you the best mix. You can premix or shrinkmix in a Smith Tilter in a fraction of the time needed by any other plant mixer. Your Smith Agitators haul full-rated loads, without a door. ● Smith Tilters are made in seven sizes — 1, 2, 3, 4, 5, 6 and 7½ yards; each guaranteed to mix 10 per cent overloads. ● Smith Agitators come in six sizes — 5, 6¼, 7½, 9, 10¼ and 11½ yards; each conforms to the Truck Mixer Manufacturers Bureau standards in every way. ● Contact your nearby Smith distributor for literature.

**THE T. L. SMITH CO., 2851 N. 32nd St., Milwaukee 10, Wis.**

*Affiliated with Essick Manufacturing Company, Los Angeles, California*

**BUILDERS OF BETTER MIXERS FOR MORE THAN 55 YEARS**

# HOW TO BUY RUBBER HOSE

## FOR LONG LIFE IN ROUGH SERVICE

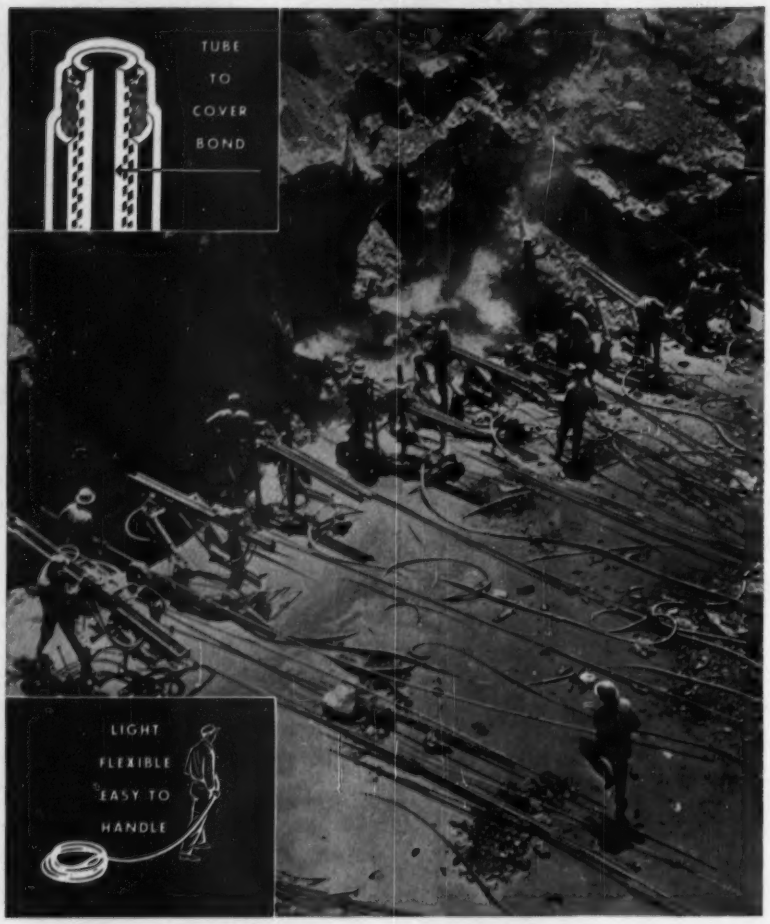
***. . . and get "More Use per Dollar"***

Look for a hose construction that is easy to handle, yet strong enough to stand up under tough operating conditions.

It is not necessary for hose to be thick and stiff and heavy. It can be light in weight and still withstand hard use on the job. The lighter the weight, the easier the hose is to handle . . . the better men will like to work with it with less fatigue. Be sure, too, that the hose you buy is the most flexible for the type or diameter you need. If it coils and uncoils easily it is not only easier to handle, there is less internal stress . . . and no kinking, breaking or separation of cover, tube or plies.

If the hose does not kink, it will last longer and you'll get full flow at all times . . . even though it is dragged over rough terrain.

Specify by name the hose construction that combines light weight, flexibility and non-kinking characteristics with maximum safety . . . specify Raybestos-Manhattan Homoflex Hose.




## HOMOFLEX HOSE

This is an exclusive R/M construction made in types for handling air, water, gases and other general uses. It has a homogeneous, inseparable tube-to-cover bond. It's as flexible as a rope, light and easy to handle, yet strong enough for the toughest jobs. It maintains uniform inside and outside diameters for easy coupling. . . . Homoflex Hose reduces hose costs by increasing hose life . . . and it's only one of many types an R/M representative can help you select for both general and special purposes. Let him show you why R/M Hose lasts much longer . . . gives you "More Use per Dollar".

RM-807

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

**RAYBESTOS-MANHATTAN, INC.**

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings • Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Bowling Balls

*The National Merit Scholarship Corporation*

# Business is Offered Big Dividends on Investment in Higher Education

Business firms searching for a satisfactory avenue to provide financial aid for our colleges and universities now have a new opportunity of major importance. It is provided by the National Merit Scholarship Corporation, which has offered to devote $8 million to matching, dollar for dollar, gifts by business firms for college scholarships and supplemental gifts to the institutions where the scholarships are used.

**The McGraw-Hill Publishing Company is availing itself of the opportunity to establish ten National Merit Scholarships. They will be known as the McGraw-Hill Merit Scholarships. The scholarships are to be awarded to qualified candidates for a four-year college course in the fields of science, engineering and the other professions and the liberal arts. There will be no limitation, beyond the appropriate professional accrediting, on the college or university selected by a successful candidate. As part of a continuing program to aid higher education and educational institutions, McGraw-Hill is happy to be able to share in what it believes to be the constructive educational endeavor of the National Merit Scholarship Corporation.**

The National Merit Scholarship Corporation, an independent agency financed initially by gifts of $20 million from the Ford Foundation and $500,000 from the Carnegie Corporation, has three major purposes which are closely related. They are:

1. To locate those of the nation's young men and young women who are best equipped to go to college.

2. When necessary, to help these young people go to college by giving them financial aid.

3. To help colleges and universities meet the full cost of the instruction of those to whom National Merit scholarships are granted.

At present about half of the nation's top high school graduates do not go to college. The principal reason is that they do not have the money required.

## To Save Unused Brain Power

The National Merit Scholarship Corporation will strive to eliminate this dangerous neglect of top-flight ability. To this end it is inviting the nation's high schools, numbering more than 24,000, to participate in its program by designating as available candidates for National Merit scholarships the top 5 percent of their senior classes. Those so designated are then invited to take a series of tests and to submit reports designed to assure selection of the very best talent in each state. The number of scholarships to be allotted to each state will be proportionate to the number of high school graduates in the state.

The winners, the total number of whom will be determined by the amount of money the Scholarship Corporation has available, will be eligible for awards. For those who need no financial help to go to college there will be honorary awards of $100. For those who must have help the Corporation will grant scholarships covering as much as necessary

of the cost of instruction and living expenses for a four-year college course.

## Colleges Get Financial Help

The provision of funds to cover the students' expenses does not, however, solve the financial problems faced by many colleges. That is because the tuition charges paid by the students do not cover the cost of the instruction. The deficit must be met by drawing upon endowment funds, gifts, grants, and other available sources.

Consequently, to prevent holders of National Merit scholarships from imposing any additional financial burden on the colleges and universities they elect to attend, the Corporation will make a supplementary grant to these institutions. The supplementary grant will be the equivalent of regular tuition charges made by the school, with a top limit of $1,500 a year for both the tuition and the supplement.

As the scholarship grants to the winning students will vary, depending upon how much financial help they need, so will the supplementary grants vary from one college to another, depending on their regular tuition charges. However, it is anticipated that on the average the full cost of a National Merit scholarship—including aid to the student and the supplement to the college—will be about $1,500 a year.

Many business firms will find a compelling appeal in a program which is designed at once to mobilize the nation's intellectual resources more effectively and, in the process, give very badly needed financial help to our colleges and universities.

## Two For One Return Offered

However, there are numerous other inducements to business firms to finance National Merit scholarships. These scholarships may:

1. Carry the name of the firm or be named in honor of someone designated by the firm.
2. Be limited to use in types of colleges of particular interest to the sponsoring firm.
3. Be limited to a college course, such as science, engineering or liberal arts, of special concern to the sponsor.
4. Be restricted to candidates or institutions in geographic areas specified by the sponsor.

In addition to these advantages there is a special financial inducement to help the Merit Scholarship program. It is that for every Merit scholarship a firm or individual finances, the Corporation will, up to the limit of $8 million, match the funds and make another National Merit scholarship available.

There are many good ways of helping our financially beleaguered colleges and universities, and many corporations are already using one or more of them.* For those companies that can do so without embarrassing complications one of the best ways is to make unrestricted gifts directly to the institutions. But this new way provided by the creation of the National Merit Scholarship Corporation (Address: 1580 Sherman Avenue, Evanston, Illinois) has the broad appeal of serving two purposes of transcendent importance simultaneously. The purposes are to see that our best brains are fully trained and utilized and that our colleges and universities, crucial contributors to this process, are helped at the same time. Business will serve the nation and its own community well by giving the National Merit Scholarship Corporation generous help.

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* These, as well as the plight of our colleges and universities, are discussed in a pamphlet, "Business Aid to Our Colleges and Universities," which embodies a series of five editorials which appeared in all McGraw-Hill publications. Copies of the pamphlet can be obtained without charge by addressing the Department of Economics, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, New York.

Methods of helping our colleges and universities financially are also outlined and discussed in a pamphlet, "Aids to Corporate Support of Higher Education," which may be obtained without cost by addressing the Council for Financial Aid to Education, 6 East 45th Street, New York 17, New York.

*This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.*

*Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.*

Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

# 75 YEARS OF BUCYRUS-ERIE LEADERSHIP . . .

December 18 marks Bucyrus-Erie's 75th Anniversary. In the years since 1880, the company has been proud to bring many significant advancements to the design of excavators . . . the first electric excavator . . . the first crawler-mounted dragline . . . the first diesel shovel . . . and too many more "firsts" to detail here. Most important, however, the know-how back of these is yours in whatever Bucyrus-Erie machine you use.

*President Theodore Roosevelt Visits Panama Canal:* This Bucyrus-Erie shovel, one of 77 used on the Big Ditch, was included in his 1908 inspection tour.

The 1½-yd. 38-B has a world-wide reputation for outstanding performance. Bucyrus-Erie offers general purpose excavators ranging from ⅜ yds. up.

## . . . GIVES YOU TOP PERFORMANCE TODAY . . .

You can expect top performance from a Bucyrus-Erie excavator because it's *built right in.* It starts with Individual Design — which means that each model in the line is designed from the ground up to handle the rated load. There is no over-powering or over-dippering to create "new" models. Parts are properly proportioned, operating functions are effectively balanced. This results in fast work cycles and big payloads, with maximum time on the job and long service life. The extras Bucyrus-Erie puts into the design and construction of excavators pay off many times over in added output and lower cost operation.

## . . . PROMISES EVEN BETTER EXCAVATORS TOMORROW

You can expect even higher performance standards from Bucyrus-Erie excavators in years to come. The development of new and improved designs, and the search for better materials and more efficient manufacturing methods never ends. With facilities unsurpassed in the industry, Bucyrus-Erie promises you excavators that will serve you better than ever.

20Y55C

*1880* BUCYRUS ERIE *1955*

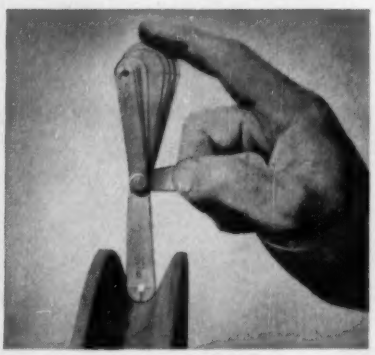
**South Milwaukee, Wis.**

*75 Years of Service to Men Who Shape the Earth*

# Tuffy tips on choosing the

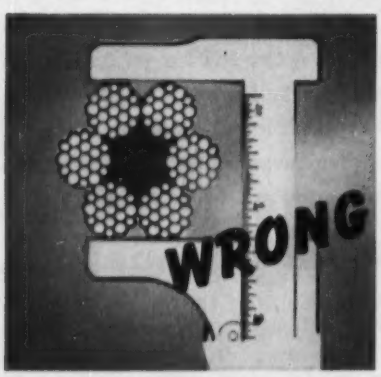
## Measure Groove Diameter Accurately

Shown above is the WRONG way to measure the groove diameter. The result—shorter life of the wire rope you buy. Note that only the sides of the rope will bear on the sheave. In a relatively short time this will squeeze the rope out of round and set up destructive friction and stresses on the rope strands and wires. New rope is oversize and diameter of grooves on sheaves and drums should be slightly larger.

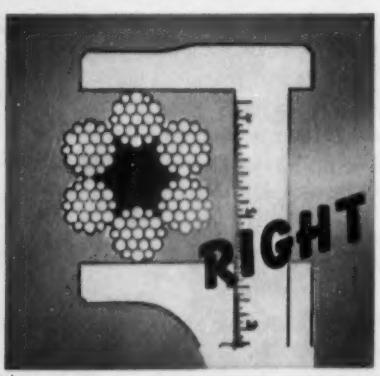


Shown above is the *CORRECT* way to measure the groove diameter. It is a simple thing to do and will give the rope you buy a chance to deliver all the service it possibly can. Remember a wire rope is composed of many closely correlated working parts and sheave grooves which are too large or too small throw them out of alignment. Just like any other working part on a machine, wire rope cannot do its best if it is misfitted.

## If Present Rope Is Correct Size, Measure with a Caliper




**Measuring the Wrong Diameter** is a common mistake that some buyers make when they order replacement rope. When the rope arrives, it turns out to be too small—even though a machinist's caliper was used to assure accuracy. It's an easy mistake to make, but it's just as easy to remember the *right* way and be sure you get the right size rope. Otherwise both the safety factor and service life of the rope will be reduced.




**Measuring the Right Diameter** is the simple step shown above. Measure so that a single strand is on each of the adjustable edges of the caliper—*not* two strands that measure as a flat side. The actual diameter of a wire rope is the same as that of the circle required to circumscribe it. The diameter of a wire rope is an important factor in determining the safe working load to be handled by your equipment.

## Replace Worn Sheaves

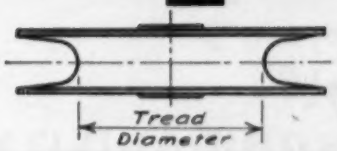
**When Replacing Rope,** check for sheaves that have been badly worn. Sheaves that have grooves corrugated by the rope lay impression should be replaced immediately before installing new rope. Since rope creeps to a certain extent on sheaves these grooves can actually cut the strands as the rope runs over. This will greatly reduce service life of *any* wire rope.

# right replacement Rope

## Beware of Critical Tread Diameters

It is highly important to accurately measure the tread diameter of the smallest sheave or drum on any machine. Here's why. It is on this sheave or drum that the wire rope will get the greatest wear. Some constructions of wire rope will work on smaller tread diameters than others without lessening their service life. Engineers have determined the critical tread diameter for different constructions as shown in the table at the right. Also shown in the table is the minimum recommended tread diameter which is 50% larger than the critical tread diameter.

Example, the tread diameter of your smallest sheave is 24 inches. You know that a 1-inch rope is necessary. Referring to the table at the right you see that the 6 x 19 Warrington or Filler wire is suitable because the minimum tread diameter recommended for it is 24 times the diameter of the 1-inch rope. This gives you a margin of 50% over the critical diameter of 16 inches. If flexibility is a factor in the operation then you would choose the Filler wire type of rope with fiber core.



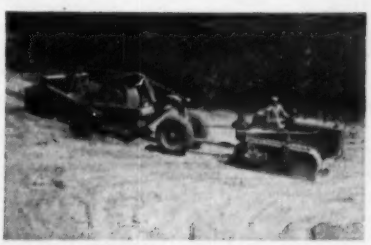

| Construction of Rope | Critical Tread Diameter | Minimum Recommended Tread Diameter |
|---|---|---|
| 6 x 7 | 28 | 42 |
| 18 x 7 | 24 | 36 |
| 6 x 19 Seale | 20 | 30 |
| 6 x 19 Warrington or Filler Wire | 16 | 24 |
| 6 x 31 | 15 | 22 |
| 8 x 19 Seale | 14 | 21 |
| 6 x 37 | 12 | 18 |
| 8 x 19 Warrington or Filler Wire | 12 | 18 |

To arrive at critical tread diameter and minimum recommended tread diameter multiply the numbers above by the rope diameter.

## Use The "Know How" of *Wire Rope* Specialists

Stemming from many years of cooperation with users and machine builders mastering wire rope problems, is a family of special ropes for special purposes. Into each is incorporated the rope construction, the grade of steel and operating characteristics found to be best for the service for which each is intended.

***When you specify one of the Tuffy Wire Ropes, you can say Tuffy and forget complicated specifications!***



**Tuffy Scraper Rope**

It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Save wasting sound rope—mount a reel on your scraper.

**Tuffy Dragline**

Constructed to give you maximum abrasive resistance with extra flexibility. Rides smoothly on grooves, hugs the drum when casting for full load.

**Tuffy Dozer Rope**

Increases service life . . . reduces down-time. 150' reels mounted on your dozers lets you cut-off worn sections without wasting good rope. 1/2" and 9/16" diameter.

**Tuffy Slings and Hoist Line**

Tuffy Hoist Line, a longer running rope on all types of hoists. Slings of 9-part machine-braided wire fabric. Kinking or knotting will not materially damage fabric.

### Your Tuffy Distributor Works For You

He's the man who can help you find a fast answer to all your wire rope problems. He's also the man who often knows as much about some requirements of your equipment as the men who made it. He's the man who's eager to supply the kind of service that will hold your patronage. Feel free to call on him anytime.

**union Wire Rope corp.**

2174 Manchester Avenue Kansas City 26, Missouri

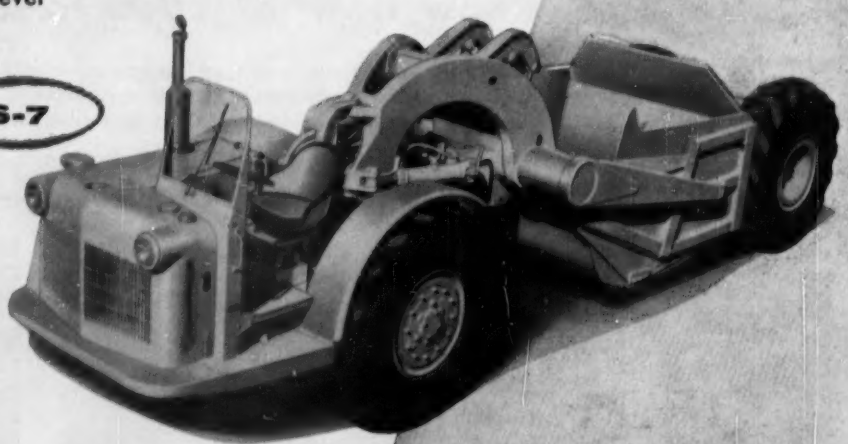
4-C *Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric*

# A complete line of 5 "EUC" SCRAPERS...

## *more* WORK-ABILITY... *Better* ACCESSIBILITY

Customer acceptance and preference has made "Euc" Scrapers the fastest selling line in the industry. The simple, practical design of every Euclid scraper model is years ahead of the field in ease of operation and maintenance and in production performance. Like all other Euclid earth moving equipment, "Euc" Scrapers are built to stay on the job longer with less down time for servicing and repair. For example, lever action provides fast, positive and independent control of bowl, apron and ejector without cable or sheave expense. The 4 section cutting blade has long life and assures efficient loading in any material. All major components are readily accessible—a mighty important cost cutting feature—in both the single axle and four wheel tractor models.

**S-7**



**The S-7 has better than 20 h.p. for each yard of payload—a 143 h.p. engine and 7 cu. yds. struck capacity. It's primarily designed for small yardage jobs and for work in close quarters where maneuverability is essential—non-stop turning radius is 28 ft.—tires are 18.00 x 25 with 21.00 x 25 optional for work in sand or other tough job conditions.**

**S-12**

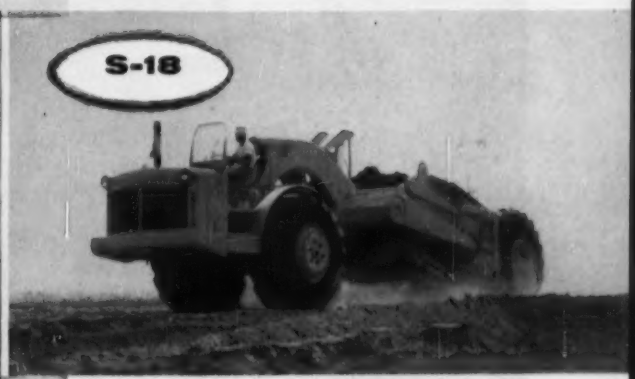
**For medium size jobs or as a utility machine on large projects, this S-12 is the answer. Payload capacity is 12 yds. struck and 16 yds. at 1:1 slope. Powered by a 218 h.p. engine, this model has a top speed of 28 mph with full payload — makes a non-stop 180° turn in 31 ft. Tires are 26.50 x 25 — width of cut is 9' 6".**

**EUCLID DIVISION**
**GENERAL MOTORS CORPORATION**
**Cleveland 17, Ohio**

# 7 to 18 yds. struck payload · 143 to 518 h.p.

## for a wide range of work—small jobs to big projects

This 15.5 yd. Scraper has built-in performance that gets more work done. It is powered by a 300 h.p. engine with either a 10-speed transmission or Torqmatic Drive—has a heaped capacity of 21 yds. at 1:1 slope, 18 yds. at 3:1. Cutting width is 10 feet. Drive tires are 24.00 x 25 standard with 29.50 x 25 available as optional equipment. The extra speed and stability of this "Euc" really pays off on long hauls.




With Torqmatic Drive and 300 h.p. engine, the S-18 hauls heaped loads up to 24 yds. at fast travel speeds—struck capacity is 18 yds. Standard tires are 27.00 x 33 with 33.50 x 33 optional for maximum traction and flotation on tough jobs. In spite of its size and capacity, the S-18 makes a non-stop 180° turn in only 36 ft.

**Twin-Power TS-18**

The TS-18 is the most recent development in the Twin-Power principle pioneered by Euclid. It is powered by two 218 h.p. engines—one in the tractor and one behind the scraper bowl. Both engines drive through separate Torqmatic Drives. Where even more power is required the tractor can be supplied with a 300 h.p. engine. It is a truly self-loading machine due to its tremendous power and traction—works on grades and under conditions that stymie other scrapers and is a one-man earthmoving outfit. Standard tires are 27.00 x 33—with 33.50 x 33 available as optional.

*For profitable scraper production and performance*

***Euclids are your best investment***

# Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

EUCLID

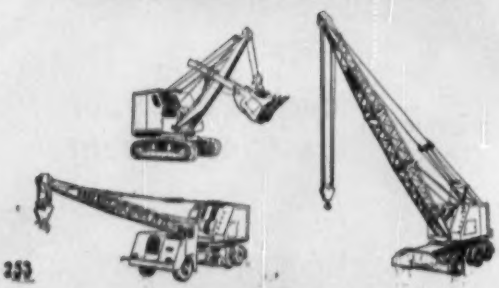
GM GENERAL MOTORS

## Good news to a profit-minded contractor

## Estimated 30 days

# FINISHED IN 12!

That's the kind of news every contractor likes to hear. And that's the kind of performance record BAY CITY is associated with more and more, on job after job. For instance, the estimate of 30 days on excavating to a depth of 25 feet in Ohio blue shale was cut to 12 days by Tom Simich & Sons Construction Company, one of the leading sewer and water contractors of Cleveland. He was using a BAY CITY 1½ yard Hoe with 54 inch dipper. Join the growing ranks of "profit-minded" contractors who are using BAY CITY excavating and material handling equipment—either crawler or rubber tire mounted. Take the first step today by writing for Catalog—no obligation, of course.



BAY CITY SHOVELS INC. • BAY CITY, MICHIGAN

# BAY CITY

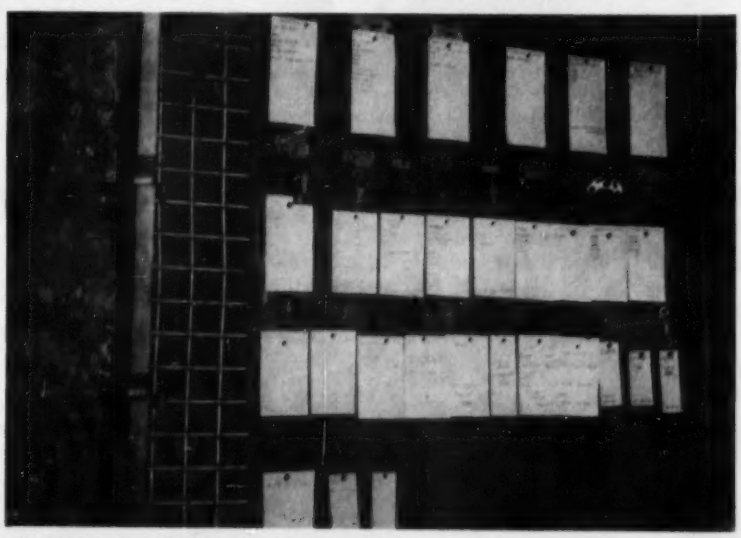
SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

## *A Stitch in Time Saves . . .*

• "We've got to pay a lot of attention to preventive maintenance; breakdowns are just too expensive," says Roland S. Spencer, Superintendent of Equipment for C. W. Blakeslee & Sons, New Haven, Conn. Spencer has been on the Blakeslee payroll since the days of horse and oxen-drawn equipment. "In those days," he says, "we stopped work at the first snow fall, knocked off the major part of the crew and turned everyone else to work on equipment maintenance. We work all year round now, but the equipment still has to be maintained."

# Contractor Needs Year-Round Maintenance

A FULL SUPPLY of spare parts assures that broken-down equipment will be back on the job after a minimum of downtime without waiting for factory parts shipments.



ALL IGNITION COMPONENTS found in company equipment are posted on a wall of the stockroom for easy reference, together with a card listing the machines using each.

MAINTENANCE WAS EXPENSIVE in the days of the long winter lay-off because it was a one-shot proposition. If a part, half worn out by one season of work, was not replaced during the winter maintenance period, there was a good chance that it would break down during the next construction season, possibly during some vital period. Many parts, with a lot of good use left in them, were replaced in the name of preventive maintenance. Modern year-round servicing gets more wear out of these parts before replacement, but the emphasis is still upon replacing the worn part before it fails.

Blakeslee employs an average of eighteen men on equipment maintenance in their city-block sized yard and on job sites. Every piece of automotive equipment has its tires checked for proper inflation and its radiator checked for water before going out on the job each morning. Experience has shown that operators are careful about their oil and gas but rarely notice water and tires.

### Values Operators' Views

Spencer covers each of the company's jobs at least once a week. On these visits he tries to speak to each operator and get his opinions on how the individual machines are operating. The maintenance force during their daily job-site lubrication of the heavy equipment also takes note of any maintenance that may be necessary. A complete card file of all equipment keeps track of all work done on the machinery, the date of repair and the mechanic making the repair. This file is useful in that many pieces

LUBRIPLATE No 630-AA IS PRACTICALLY A UNIVERSAL LUBRICANT

—says

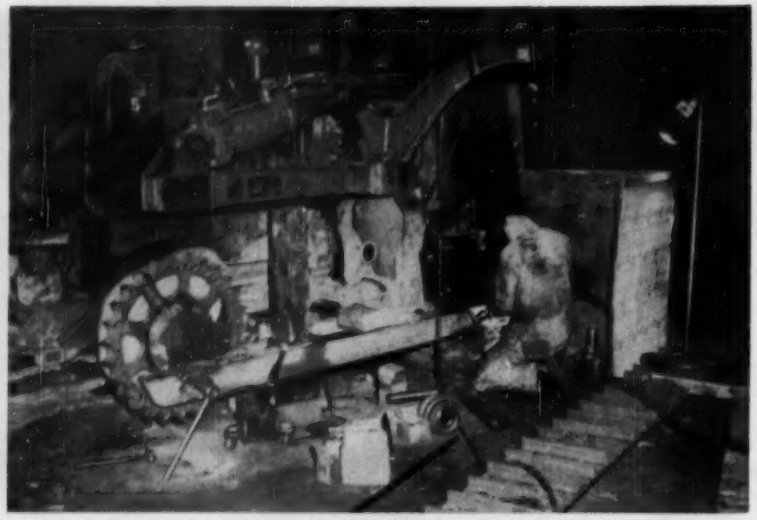
THE SPOKANE PORTLAND CEMENT CO.

"With the introduction of LUBRIPLATE No. 630-AA, we were able to satisfy all our needs for solid type lubricants with only two LUBRIPLATE Products. LUBRIPLATE No. 630-AA might almost be considered a universal lubricant. Furthermore, it has effected marked savings in both lubricants and labor!"

**REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.**

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.



CRAWLER-MOUNTED EQUIPMENT requires thorough overhaul after about 100 hr of service. Spencer schedules repairs at this time to get the maximum service from equipment.

BLAKESLEE'S WELDING, blacksmithing and machine shops are set up to handle any foreseeable maintenance problem. A partial equipment list includes a forge, four welding machines, bolt threader, lathe, miller, shaper, grinders, heavy-duty press.

of equipment develop characteristic troubles which require repeated maintenance.

Experience over a period of years has established the useful life of components. Spark plugs are replaced at about 5,000 mi in automotive equipment. Tractors and crawler-mounted equipment are usually in need of pretty thorough overhaul after 100 hr of service, as are most heavy-duty engines. Repairs scheduled for these intervals reduce on-the-job downtime.

Ignition systems have been found to be a particularly troublesome item of maintenance. Therefore, all of the various ignition components used in the company's equipment have been assembled and mounted on a board prominently displayed in the engine shop stockroom. Under each component is a card listing the units using each component for quick reference.

Because of their location in New Haven, Blakeslee yard does not have access to major sources of parts supply. They therefore keep a fairly complete supply of spares. The second floor of one of their maintenance buildings is filled with racks and bins, each labeled with the name of the equipment manufacturer whose parts are to be found there.

**NOW**... out of 250 million hours of flight power experience comes

# a NEW air-cooled industrial engine the FULL POWER LYCOMING C2-90

**Rated 30 H.P.! Delivers 30 H.P.!**

## Specifically designed to solve construction industry problems

The C2-90 is built to the same high standards that have made Lycoming a top name in aircraft engines for over a quarter century. The C2-90 does just what we say it will do—work at full power under the most rugged conditions. So why buy an engine you have to de-rate (up to 50% for continual duty service)?

**Reserve Power**—C2-90's full-power rating provides ready reserve for everything from heavy generators to light pumps.

**Long Life**—C2-90 is ruggedly designed for thousands of hours of dependable service.

**Cooling Design**—C2-90 provides newly improved cooling surfaces to avoid overheating from dust conditions; a cooling fan that operates through entire speed range.

**All-Weather Performance**—C2-90 advanced air-cooled design delivers rated output in high temperatures or sub-zero.

**Imagine running your car for 80,000 continuous miles without service!** In Williamsport, Pa., the C2-90 was test-run at full load, full throttle for over 1,000 continuous miles with no service except for gas and oil. This is equivalent to running your auto 80 miles an hour for 1,000 hours non-stop, or 80,000 continuous miles *without service!*

LOOK TO

For full details on the new Lycoming C2-90 write:

Sales Engineering, Industrial Engines,
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Lycoming

AVCO defense and industrial products

AVCO MFG. CORP.

combine the scientific skills, and production facilities of 3 Avco divisions of Avco Manufacturing Corp.... Lycoming; Avco Advanced Development; Crosley—to produce power plants, electronics, air-frame components, and precision parts.

*Wire rope lasts as long as the wire it's made of!*

**ROEBLING'S NEW ROPE WIRE**

# 1105

**HAS THE CAPACITY TO ENDURE...**
**AND**

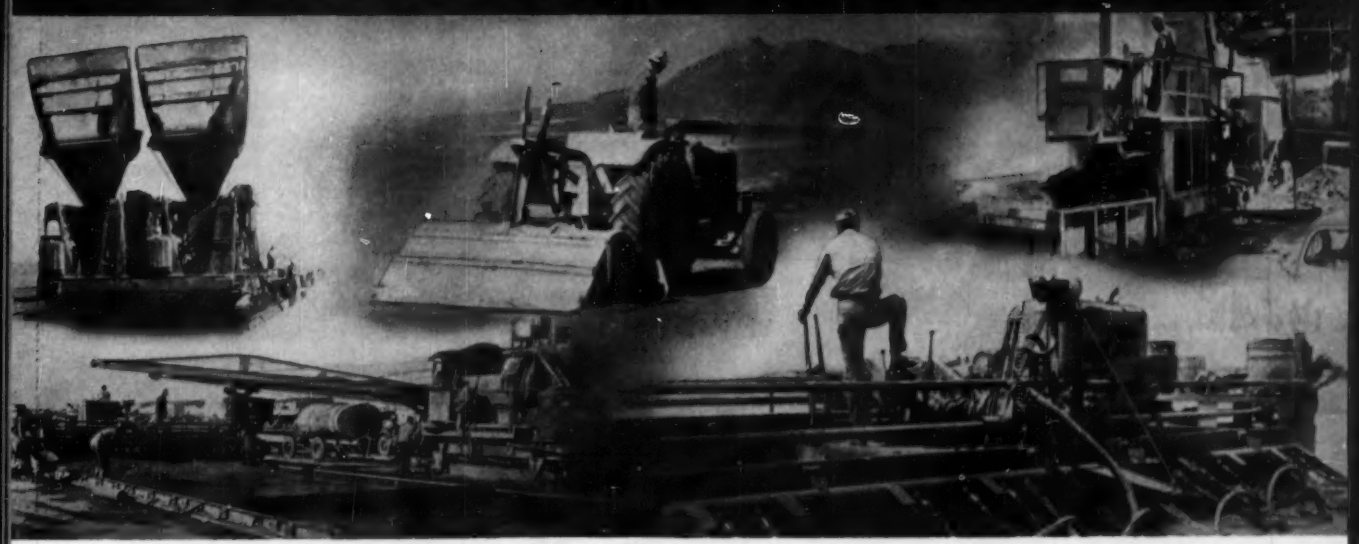
*Royal Blue*

**WIRE ROPE**
**IS MADE OF 1105!**

*Write us for full facts on the all-steel Royal Blue Wire Rope, or contact your Roebling distributor*

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 5253 FREDONIA AVE. • CLEVELAND, 19235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4501 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 5216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

# PAVING...How to Get the Best Results



## 4. Plant-Mix Bituminous Pavements

By BERNARD E. GRAY
Former President, The Asphalt Institute

MORE THAN TWO-THIRDS of all high type pavement in the United States is either plant-mix or penetration macadam. And resurfacing of old roads is proceeding at such a rapid rate that by next year at least 330,000 miles or 70% of all high type surfaces will have some form of plant-mix bituminous wearing course.

Plant mixtures were employed first almost entirely for paving city streets because the volume of work justified installation of a permanent plant. Development of the modern portable asphalt plant has produced today's wide-spread application. And ease of placement and compaction has led to many new uses. Surfacing of sidewalks, parking areas, playgrounds, and airfields developed logically from street paving. Water and erosion control with plant mixes is a newer development. Lining of reservoirs to prevent leakage, revetment of river banks and ocean beaches, placement of jetties and groins for beach and channel protection today account for a large volume of work. Altogether, about 60 million tons of all kinds of plant mix are produced each year.

There are two principal categories of plant-mix pavements—hot-laid and cold-laid. Cold-laid mixtures are placed and finished at atmospheric temperatures. They may be mixed either hot or cold, according to the kind of binder used. One variety of cold-laid mixture is Amiesite. To mix Amiesite the aggregate first is coated with a slow-curing naphtha, then hot asphalt cement is added, but final curing is delayed until the two amalgamate.

Another variety is produced by adding powdered asphalt to a precoated aggregate. A third variety results from the use of either cutback or emulsified asphalt as the binder. These cold-laid mixtures are particularly suitable for jobs where a considerable interval of time must elapse between manufacture and use because the curing time can be adjusted by varying the retarding constituent.

Hot-laid mixtures are mixed hot and laid hot. They must be placed soon enough after mixing so that the retained heat will permit spreading and compaction. But rapid truck delivery makes hauls of up to 50 miles common.

The principal qualities needed in any plant-mix pavement are stability, flexibility, durability, and frictional resistance. The order of importance of these qualities varies according to the purpose of the pavement. Highway pavement must be completely stable, have high frictional resistance and appropriate durability and flexibility. A beach revetment must be durable and flexible, but stability and frictional resistance are of less importance. Laboratory and field procedures have been perfected to such a degree that mixtures can be adjusted to meet the needs of any situation.

Proportioning of aggregate and asphalt is all-important. The most effective combination varies according to the purpose of the pavement, but the mix must be maintained within close limits of uniformity. It's a common error to assume that the mixture will prove satisfactory so long as it falls within the broad range of a specification. This is true only with exceptional aggregates. Usually a job-mix formula, designed for the particular aggregate available, should be established before the start of work, and only small deviation from this formula can be

**Table 1 . . . Hot-Mix, Hot-Laid, Asphaltic Concrete (Dense Graded Type)**

Covers Base and Surface Mixtures

(Usual range in thickness each layer, 1 to 3½ in.)

Coarse Aggregate—crushed stone, slag, or gravel.

Fine Aggregate—sand, stone screenings or mixtures thereof.

Filler (Mineral dust)—85% passing 100 sieve, 65% passing 200 sieve, and completely unaffected by water.

Asphalt Cement—60-70, 70-85, 85-100, 100-120, 120-150, 150-200 pen.

NOTE—Following mixtures are typical, coarse to fine-graded

| Mix No. | | | I | II | III | IV | V |
|---|---|---|---|---|---|---|---|
| Courses for which recommended | | | Lower or Intermediate | | Intermediate or Surface | Surface | |
| Min. thickness, individual course | | | 3 in. | 2½ in. | 2 in. | 1½ in. | 1 in. |
| Max. thickness, individual course | | | 3½ | 3½ | 3 | 2½ | 2 |
| **MINERAL AGGREGATE COMBINATION** | | | | | | | |
| *Constituent* | *Passing Sieve* | *Ret. on Sieve* | *Per Cent by Weight* | *Per Cent by Weight* | *Per Cent by Weight* | *Per Cent by Weight* | *Per Cent by Weight* |
| Coarse Aggregate | 2 in. | 1 in. | 15-45 | - | - | - | - |
| | 1½ | ¾ | - | 14-48 | - | - | - |
| | 1 | ½ | 3-45 | - | 17-52 | - | - |
| | ¾ | ⅜ | - | 3-45 | - | 18-50 | - |
| | ½ | ⅜ | - | - | - | - | 8-39 |
| | ½ | No. 4 | - | - | 6-42 | - | - |
| | ⅜ | No. 4 | - | - | - | 3-36 | 8-45 |
| | No. 4 | No. 10 | 5-15 | 5-15 | 5-15 | 9-22 | 9-27 |
| Sub total | — | No. 10 | 60-80 | 55-75 | 55-70 | 50-65 | 50-65 |
| Fine Aggregate Filler | No. 10 | No. 40 | 3-19 | 3-21 | 4-20 | 5-22 | 5-22 |
| | No. 40 | No. 80 | 5-22 | 6-25 | 8-25 | 9-27 | 9-27 |
| | No. 80 | No. 200 | 3-15 | 3-16 | 4-16 | 5-18 | 5-18 |
| | No. 200 | — | 3-5 | 4-6 | 4-7 | 5-8 | 5-8 |
| Sub total No. 10 | | — | 20-40 | 25-45 | 30-45 | 35-50 | 35-50 |
| Total Mineral Matter | | | 100 | 100 | 100 | 100 | 100 |
| **TOTAL MIX** | | | | | | | |
| Total mineral aggregate | | | 93.5-95.5 | 93.0-95.0 | 93.0-95.0 | 92.0-94.0 | 92.0-94.0 |
| Asphalt Cement (bitumen)* | | | 4.5- 6.5 | 5.0- 7.0 | 5.0- 7.0 | 6.0- 8.0 | 6.0- 8.0 |
| Total Mix | | | 100 | 100 | 100 | 100 | 100 |

*For highly absorptive aggregates the upper limit may be raised.

APPROXIMATE QUANTITIES FOR A 3 IN. BASE COURSE USING MIX NO. III

| Materials | Per Sq Yd | Per Mi, 1 Ft Wide |
|---|---|---|
| Coarse Aggregate | 195.0 lb | 57.3 tons |
| Fine Aggregate | 75.0 " | 22.0 " |
| Mineral Filler | 15.0 " | 4.4 " |
| Asphalt Cement | 15.0 " | 4.4 " |

MECHANICAL SPREADER-FINISHER places second layer of hot-mix bituminous material. This machine travels on crawler tracks; some finishers are mounted on rubber-tired wheels.

## PLANT-MIX PAVEMENTS . . .

Continued from page 121

permitted. (See tables 1 to 10 for quantities of aggregates and asphaltic materials usually required).

## Asphalt Plants

The modern asphalt plant is a factory. Properly assembled and controlled it will turn out a finished product just as accurately as a textile mill. The modern plant is almost completely automatic. It consists essentially of:

- An aggregate heater or drier.
- Screens and bins for separating and storing dried aggregates.
- Asphalt storage and heating tanks.
- Devices for accurately proportioning quantity of each size of aggregate and quantity of asphalt used.
- A mechanical mixer to produce the final product.

There are two principal types of plants—batch plants and continuous mixing plants. Specifications usually permit either type to be used provided equipment includes certain designated controls to assure uniformity of operation.

Batch plants are rated by the weight of the individual mix, which ranges from 750 lb to 6,000 lb. Plants are often doubled up when large output is required. In construction of the New Jersey Turnpike, for example, four 4,000-lb plants were operated side by side for an effective one-plant setup.

Continuous mixing plants are rated by the number of tons produced per hour. The range usually is from 25 to 150 tons hourly capacity. In operation, the hourly output of any continuous mix plant varies somewhat according to the character of the aggregate and asphaltic material used. Some aggregates require longer mixing than others to become properly coated.

## Selection of Size

A contractor should evaluate his requirements carefully before he buys an asphalt plant. A common fault is to buy a plant of too small capacity and then try to crowd the operation. That just doesn't pay. The equipment breaks down, and profits disappear. The problem is to balance the increased investment in larger capacity against the possible delays that might result from selection of a smaller plant. A 2,000-lb batch plant can turn

*(Continued on page 126)*

# Quickest Way to Get a Refusal

## *Chrysler-powered jetting pumps help sink 1250 ninety-foot piles into hard-packed sand, averaging 25 per day*

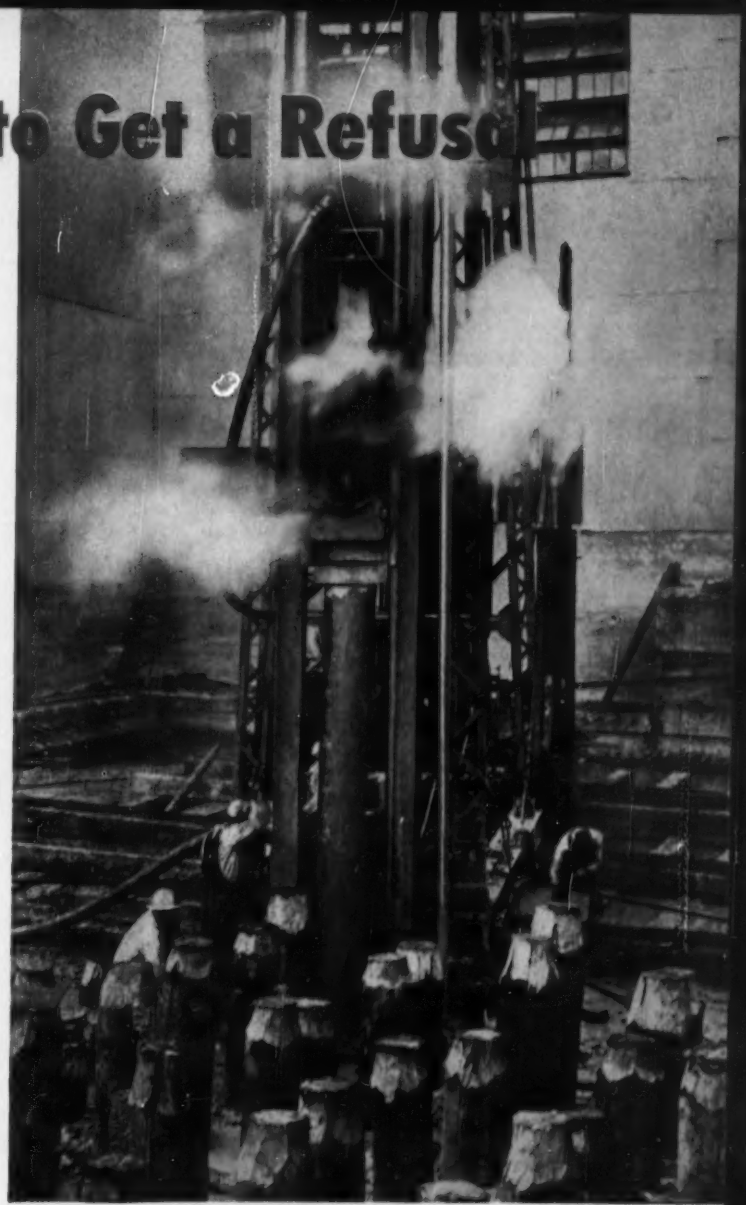


PHOTO COURTESY JAEGER MACHINE COMPANY, COLUMBUS, OHIO

Job: foundation for addition to large electric power plant. Objective: bring 1250 ninety-foot timber piles to bear on hard pan underlying tight-packed sand formation. Problem: impossible to drive piles into hard sand with hammer. Solution and method of operation: two Chrysler Ind. 32-powered high-pressure Jaeger jetting pumps operating in parallel or in series as necessity required.

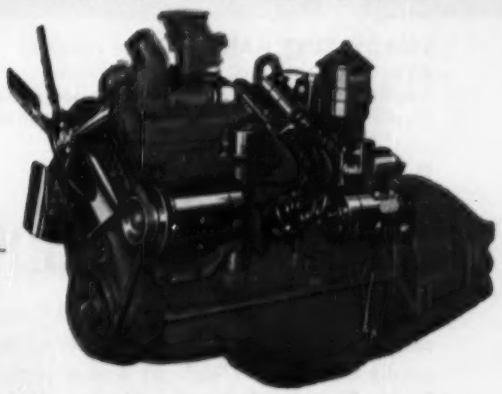
It wasn't that simple, however. Hard-packed sand is never easy to penetrate. Operating in parallel the two pumps discharged 950 gallons per minute at 200 pounds per square inch pressure to blast holes more than eighty feet deep into which the piles sank with only the weight of the hammer. Six to nine minutes of driving with hammer then brought the piles to refusal at hard pan. When greater pressure was needed, the pumps were set to operate in series delivering 475 gallons per minute at 400 pounds per square inch. At many points sand formation was so tight the jet stream would work like a hydraulic piston and send pipe and all shooting out of the ground. To counteract this, extra-heavy pipe weighing over 2800 pounds was used.

Despite difficulties the jetting operation was handled with unusual speed. On the average it took about fifteen minutes to drive a pile to refusal. As many as 33 piles were put down in a single eight-hour day. The two Jaeger Model 5 CPH Pumps and Chrysler Ind. 32—265 cubic inch displacement engines required nothing beyond regular maintenance care.

Assure your users record-breaking performance with top operating economy. Power with *proven-dependable* Chrysler Industrial Engines—230 to 413 cubic inch displacement. A long list of optional equipment enables Chrysler to supply engines to meet end product requirements.

Chrysler Industrial Engines are not expensive. Production-line methods adapted to specialized industrial engine building provide custom-built engines at mass-production prices. See a Chrysler Industrial Engine Dealer, or write:

***Dept. 1012, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

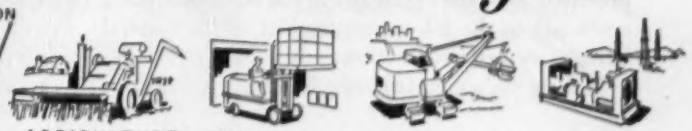


CHRYSLER IND. 32 ENGINE—
265 CUBIC INCH
DISPLACEMENT

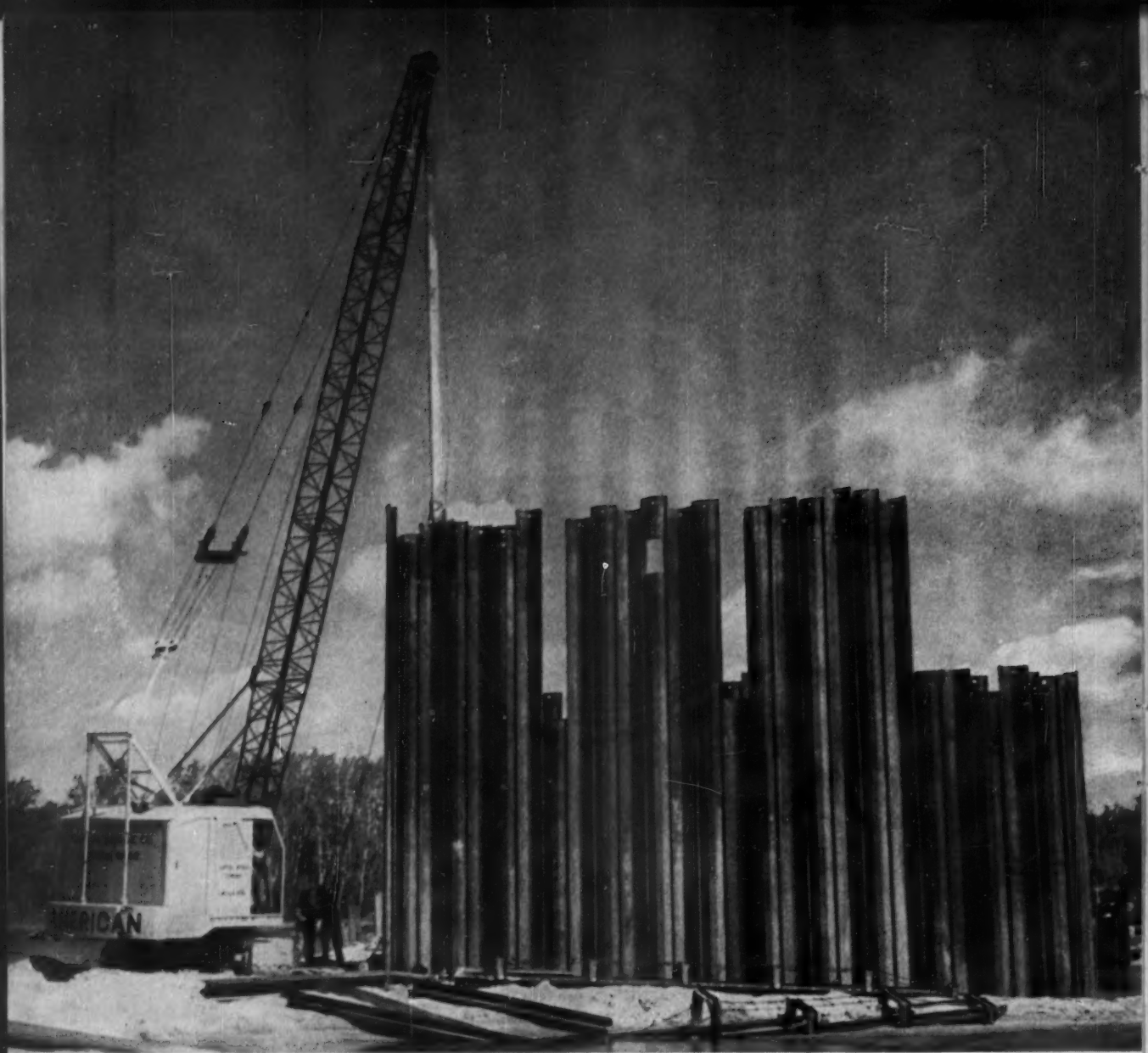
# CHRYSLER *Industrial Engines*

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

HORSEPOWER WITH A PEDIGREE



AGRICULTURE • INDUSTRY • CONSTRUCTION • OIL FIELDS



**STEADY, SURE HANDLING** was necessary to set and drive the sheet steel pilings for the coffer dams. The American above is finishing the coffer dam before driving. On the U. S. Highway 77 bridge one mile South of Fremont, Nebraska, the American out-produced four other cranes, *some with higher rated capacity*. The American's versatility enabled it to reach and lift many kinds of loads under adverse working conditions.

## Bridge contractor gets...

# 20% MORE PRODUCTION WITH AN AMERICAN

An American 300 Series Crane showed unusual versatility and tremendous lifting power under difficult conditions during a highway bridge project on the Platte River in Nebraska recently. The American worked alongside four other cranes on this job and produced 20% more than any of the other machines, according to the job superintendent of the Capital Bridge Company contractors.

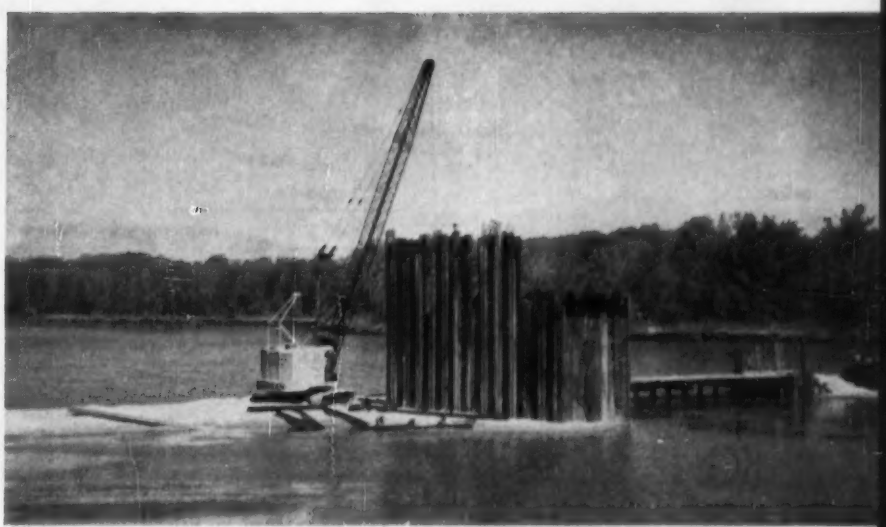
Making the coffer dams required setting and driving sheet steel pilings down through the river bottom to a hard clay underlay. Then, after excavating inside the coffer dams, thirty-two 41-foot 10-inch H-beam pilings were driven into the hard clay to form the footings for the ten pier foundations used in the 1,350-foot bridge.

The ability of the American Crane to perform permitted the operator to line up his sheet pilings fast and accurately.

*(Advertisement)*

**"MOST POWERFUL** for its rated capacity," says Al Goebel, operator for the Capital Bridge Company, of the American 300 Series Crane. "I've operated a lot of them," he says, "but this new American 300 Series is the easiest of all to handle." Anti-friction bearings in American's brake linkage cut leg effort of the operator in half and boost production accordingly.

**IN MID-RIVER** on a sandbar, the American 300 Series Crawler Crane easily sets and drives piling used in the coffer dams. Working with American, Capital Bridge found another important advantage in the ease with which the machine can be transported from one project to another. They found that the American Crawler Crane can be moved over Nebraska highways *without special travel permits* which cut their lost time and considerably lessened routine "red tape."



**UNDISPUTED LEADER** for heavy hoisting equipment is the proud title earned by American on the world's biggest and toughest jobs. Above, two American Stiffleg Derricks with 115-foot booms and 53-foot masts are shown setting a 167-ton girder with surety and ease. This same capacity for peak performance under the toughest working conditions is built into American Crawler and Truck Cranes. For factual detailed information on how American Crawler and Truck Cranes can boost production on your jobs, see your American Distributor, or write American Hoist & Derrick Co., St. Paul 1, Minnesota.

700-17-10

## PLANT MIX PAVEMENTS . . .

Continued from page 122

out between 40 and 75 tons per hour, depending upon the mixing time required for the particular aggregates and asphaltic materials used. It's my opinion that, in general, a capacity of at least 75 tons per hour is desirable. In selecting a plant it is better to buy one that may be a little bigger than necessary than to buy one that may prove to be too small.

The dryer is the bottleneck of an asphalt plant. It determines the over-all plant capacity. Drying aggregate is a straight problem of heat exchange, but the design of the dryer has an important bearing on fuel consumption. Great advances in dryer design have been made in recent years. Early designs called for long sections, and drying was almost entirely dependent on convection. Today, heat transfer is by both convection and radiation. This permits shorter sections of large diameter and means lighter weight, less work.

Obviously the less moisture in the aggregate as it reaches the dryer, the less work the dryer must do. Considerable savings often can be made by keeping aggregate dry in stockpiles and by feeding it to the cold elevator in an efficient way. Other factors that affect the rate of drying include the required temperature of aggregate for mixing, the porosity of the aggregate,

### Table 2 . . . Hot-Mix, Hot-Laid, Asphaltic Concrete (Graded Aggregate Type)

Covers Base and Surface Courses
(Usual range in thickness 1 to 3½ in.)

Coarse Aggregate—Crushed stone, slag, or gravel.

Fine Aggregate—Sand, stone-screenings or mixture thereof.

Filler (Mineral dust)—85% passing 100 sieve, 65% passing 200 sieve, and completely unaffected by water.

Asphalt Cement—60-70, 70-85, 85-100, 100-120, 120-150, 150-200 pen.

NOTE: The mix numbers shown are typical, from coarse to fine.

| Mix. No. | I | II | III | IV | V |
|---|---|---|---|---|---|
| Courses for which recommended | Lower or Intermediate | | Intermediate or Surface | Surface | |
| Min. thickness, individual course | 3 in. | 2½ in. | 2 in. | 1½ in. | 1 in. |
| Max. thickness, individual course | 3½ | 3½ | 3 | 2½ | 2 |
| Sieve Size | Combined Aggregate Including Filler Total Passing, Per Cent by Weight | | | | |
| 2½ in. | 100 | - | - | - | - |
| 2 | 95-100 | 100 | - | - | - |
| 1½ | 80-95 | 95-100 | 100 | - | - |
| 1 | - | - | 95-100 | 100 | - |
| ¾ | 60-75 | 70-85 | - | 95-100 | 100 |
| ½ | - | - | 70-85 | 75-90 | 95-100 |
| No. 4 | 30-45 | 35-50 | 40-55 | 45-60 | 60-80 |
| No. 10 | 20-35 | 25-37 | 30-42 | 35-47 | 40-55 |
| No. 40 | 12-22 | 15-25 | 20-30 | 23-33 | 25-35 |
| No. 80 | 6-16 | 6-16 | 12-22 | 16-24 | 18-27 |
| No. 200 | 0-4 | 2-6 | 5-10 | 6-12 | 8-15 |
| *To the above shall be added Asphalt Cement Lb per 100 lb of aggregate | 4.0-6.0 | 4.5-6.5 | 5.0-7.0 | 6.0-8.0 | 6.0-8.5 |

*For highly absorptive aggregates the upper limit may be raised.

APPROXIMATE QUANTITIES FOR A 2 IN. SURFACE COURSE USING MIX NO. III

NOTE—As a surface course, Mix No. III would be slightly more dense than when used as a base.

| Materials | Per Sq Yd | Per Mi, 1 ft Wide |
|---|---|---|
| Coarse Aggregate | 120.0 lb | 35.2 tons |
| Fine Aggregate | 56.0 " | 16.4 " |
| Mineral Filler | 12.0 " | 3.5 " |
| Asphalt Cement | 12.0 " | 3.5 " |

### Table 3 . . . Hot-Mix, Hot-Laid Stone-Filled Sheet Asphalt Surface Courses

(Usual thickness 2 in.)

Coarse Aggregate, crushed stone, or slag ½ in. to No. 8 sieve.

Fine Aggregate, Sand, No. 10 to 200.

Filler (mineral dust) 85% passing 100 sieve, 65% passing 200 sieve, and completely unaffected by water.

Asphalt Cement 50-60, 60-70, 70-85 or 85-100 pen.

COMPOSITION OF MIX

| Passing | Retained on | Per Cent |
|---|---|---|
| ½-in. sieve | No. 10 sieve | 20-35 |
| No. 10 " | No. 40 " | 7-30 |
| No. 40 " | No. 80 " | 11-40 |
| No. 80 " | No. 200 " | 10-30 |
| No. 200 " | — | 7-12 |
| Bitumen | | 7-9.5 |
| Voids in compacted mix | | 5— |

APPROXIMATE QUANTITIES FOR 2 IN. COMPACTED THICKNESS

| Materials | Per Sq Yd | Per Mi, 1 Ft Wide |
|---|---|---|
| Coarse Aggregate | 56.0 lb | 16.4 tons |
| Sand | 108.0 " | 31.7 " |
| Mineral Filler | 19.5 " | 5.7 " |
| Asphalt Cement | 16.5 " | 4.9 " |

### Table 4 . . . Hot-Mix, Hot-Laid Sheet Asphalt Binder and Surface Courses

(Usual thickness 1½-in. binder, 1½-in. sheet asphalt)

Coarse Aggregate for Binder, crushed stone, 1 in. to No. 8 sieve

Fine Aggregate for Binder, sand, No. 4 to No. 200 sieve

Sand for Surface Course, No. 10 to No. 200 sieve

Filler (Mineral Dust) 100% passing No. 30, 85% passing No. 100, 65% passing 200 Sieve, and completely unaffected by water.

Asphalt Cement, 50-60, 60-70, 70-85, or 85-100 pen.

COMPOSITION OF BINDER COURSE

| Passing | Retained on | Per Cent |
|---|---|---|
| 1-in. sieve | No. 4 Sieve | 52-72 |
| No. 4 " | No. 10 " | 8-20 |
| No. 10 " | — | 15-35 |
| Bitumen | | 4-6 |

COMPOSITION OF SURFACE COURSE

| Passing | Retained on | Per Cent |
|---|---|---|
| No. 10 sieve | No. 40 sieve | 10-40 |
| No. 40 " | No. 80 " | 20-45 |
| No. 80 " | No. 200 " | 12-32 |
| No. 200 " | — | 10-20 |
| Bitumen | | 9.5-12 |

APPROXIMATE QUANTITIES FOR 3 IN. COMPACTED THICKNESS

| Materials | | Per Sq. Yd. | Per Mi, 1 Ft. Wide |
|---|---|---|---|
| Coarse Aggregate for Binder | | 100 lb | 29.3 tons |
| Sand for Binder | 36 | 151.0 " | 44.3 " |
| Sand for Surface Course | 115 | | |
| Mineral Filler, Surface Course | | 23.0 " | 6.8 " |
| Asphalt for Binder | 7 | 23.0 " | 6.8 " |
| Asphalt for Surface Course | 16 | | |

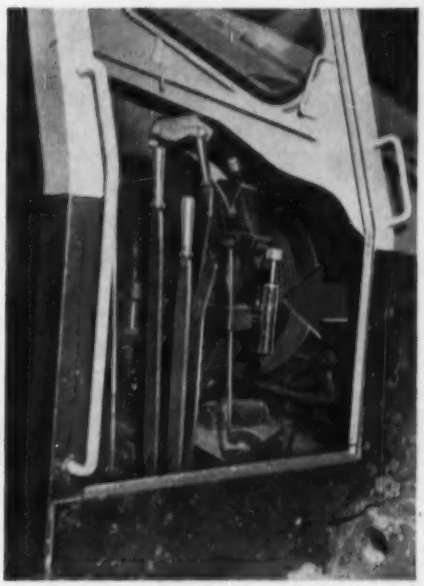
# The Engineer's Report

CASE HISTORY

PRODUCT Chevron Starting Fluid

FIRM Larry Hendricks Construction Co., Mt. Vernon, Wash.

# Special fluid starts shovel in seconds saves manpower, batteries in cold weather



PIPE LINES, ROAD CONSTRUCTION and general contracting jobs keep this ¾ yd. Bucyrus-Erie shovel working hard the year 'round. The Larry Hendricks Construction Co. uses 7-cc. gelatin capsules of Chevron Starting Fluid to get the rig's GM-371 powerplant into action fast in cold weather. Owner Hendricks says, "This shovel makes money only when it's working. I can't afford to waste man-hours or wear down batteries getting it started. With Chevron Starting Fluid one man puts it on the job in a few seconds, even in coldest weather. We like the capsules, too. They deliver a safe, controlled charge. Too much fluid makes an engine race, and that ruins bearings quick." Capsules are discharged through manual applicator installed in cab of excavator. (See arrow, right.) Chevron Starting Fluid atomizes at temperatures as low as -65° F. Fires under pressure or weakest engine spark.

**FREE FOLDERS** tell more about the Chevron Starting Fluid and Chevron Pressure Primer System. Write or ask for them.

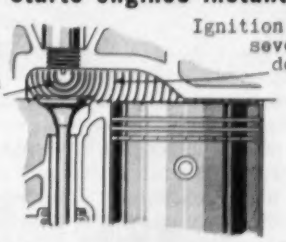
**FOR MORE INFORMATION** about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies listed below.

CHEVRON STARTING FLUID

## Why Chevron Starting Fluid starts engines instantly

Highly volatile: 7 times more than gasoline

Ignition temperature several hundred degrees lower than diesel fuel



Contains wear-reducing lubricants

Additives inhibit ice formation

TRADEMARK "CHEVRON" AND DESIGN REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

## Table 5 . . . Hot-Mix, Hot-Laid, Sand-Asphalt Base and Surface Courses For Wide Variety Irregularly Graded Sands

(Usual thickness 3 in. base 2 in. Surface)

GRADING REQUIREMENTS FOR SAND

Passing No. 4 Sieve ..... 100% by weight
Passing No. 200 sieve not more than ..... 25% by weight

NOTE 1—It shall have a certain minimum stability when mixed with 4% asphalt cement, and failing this, shall have other aggregate added until stability is obtained.

MINERAL FILLER

Passing No. 30 sieve 100%, No. 100 sieve 85%, No. 200 sieve 65%, and completely unaffected by water

ASPHALT CEMENT

85-100 or 100-120 pen.

NOTE 2—If compacted mix contains more than 10% voids, seal coat will be required.

COMPOSITION OF MIXTURES

| Material | Base | Surface |
|---|---|---|
| | Per Cent | |
| Passing No. 4 Sieve | 100 | 100 |
| Passing No. 200 Sieve | 0-25 | 10-30 |
| Bitumen | 4-7 | 5-10 |

APPROXIMATE QUANTITIES FOR 3 IN. COMPACTED THICKNESS

| Materials | Per Sq Yd | Per Mi, 1 Ft Wide |
|---|---|---|
| Sand | 240 lb | 70.8 tons |
| Mineral Filler | 36 " | 10.5 " |
| Asphalt Cement | 24 " | 7.0 " |

## Table 6 . . . Hot-Mix, Hot-Laid, Graded-Aggregate Type, Using Liquid Asphalt Binder

(Usual thickness 1 to 2 in.)

Mineral Aggregate—Crushed stone, slag, crushed or uncrushed gravel. Wide variety possible—Sand, stone screenings and/or mineral dust.

AGGREGATE GRADING REQUIREMENTS

| Mix No. | I | II |
|---|---|---|
| Thickness of Course | 1 to 2 in. | 1 in. & Feather Edging |
| Total Passing | Per Cent by Weight | |
| ¾ in. sieve | 100 | 100 |
| ½ " | 80-100 | 95-100 |
| No. 4 " | 35-75 | 55-75 |
| No. 10 " | 20-60 | 35-55 |
| No. 40 " | 10-35 | 20-30 |
| No. 200 " | 0-8 | 0-8 |

ASPHALT BINDER MC-4, MC-5, or RC-4, RC-5, or SC-4, SC-5

NOTE: Selection of binder according to climatic conditions, and method of spreading. These mixtures often used for evening and shaping old surfaces, using long wheel base graders. Per cent of binder, 4 to 6.

APPROXIMATE QUANTITIES FOR 2-IN. COMPACTED THICKNESS

| Materials | Per Sq Yd | Per Mi, 1 Ft Wide |
|---|---|---|
| Mineral Aggregate | 185.0 lb. | 54.2 tons |
| Asphalt Binder | 1.8 gal. | 1056.0 gal |

## Table 7 . . . Cold-Laid Asphalt Plant-Mix, Pre-Coated Macadam Aggregate Type

(Usual thickness 2 in.)

Mineral Aggregates—Crushed stone or slag; fine aggregate may be sand.

GRADATION OF AGGREGATES

| Type | Coarse | Medium | Fine |
|---|---|---|---|
| Simplified Practice No. | 5 | 68 | * |
| Total Passing | Per Cent | Per Cent | Per Cent |
| 1½ in sieve | 100 | — | — |
| 1 " | 90-100 | 100 | — |
| ¾ " | 40-75 | 90-100 | — |
| ½ " | 15-35 | — | — |
| ⅜ " | 0-15 | 30-65 | 100 |
| No. 4 " | 0-5 | 5-25 | 95-100 |
| No. 8 " | — | 0-5 | — |
| No. 16 " | — | — | 45-80 |
| No. 50 " | — | — | 5-30 |
| No. 100 " | — | — | 0-8 |

*A.S.T.M. Specification C 33.

Hydrated Lime—ASTM Specification C 6
Asphalt for pre-coating—Grade MC-O cut-back asphalt
Asphalt Binder—Asphalt cement, 85-100 pen.

NOTE: This is similar to old Amiesite mix, except asphalt primer MC-O is used instead of naphtha as safer and a better coating.

PROPORTIONS FOR MIXTURES

| Type Mixture | Coarse | Medium | Fine |
|---|---|---|---|
| Constituents | Per Cent | Per Cent | Per Cent |
| Mineral Aggregate | 92.0-95.0 | 90.0-93.0 | 94.0-97.0 |
| Asphaltic Primer | 1.0-2.0 | 1.0-2.5 | 1.5-2.5 |
| Asphalt Cement | 3.5-5.5 | 5.0-7.0 | 1.5-3.5 |
| Hydrated Lime | 0.5-1.0 | 0.5-1.0 | 0.1-0.5 |

APPROXIMATE QUANTITIES FOR 2-IN. COMPACTED THICKNESS

| Materials | Per Sq Yd | Per Mi, 1 Ft Wide |
|---|---|---|
| Coarse Aggregate | 135.0 lb | 39.6 tons |
| Medium Aggregate | 50.0 " | 14.7 " |
| Fine Aggregate | 4.0 " | 1.2 " |
| Hydrated Lime | 2.0 " | 0.6 " |
| Asphalt Primer (MC-O) | 0.4 gal | 235.0 gal |
| Asphalt Cement (85-100 pen) | 9.0 lb | 2.7 tons |

and atmospheric conditions. All these factors should be considered before purchase of the aggregate. An apparent lower first cost for aggregate may be offset by increased drying and screening costs.

All too often aggregates are fed to the dryer at random. The result usually is improper balance in the amounts that reach the hot bins. Many specifications now spell out the manner of feed to the cold elevator in order to assure proper proportioning.

There are three principal methods of feeding aggregate to the cold elevator. The one selected should depend on climatic conditions and the degree of control required. One method is to provide as many cold bins as there are different sizes of aggregate and to keep the bins filled by crane from adjacent stockpiles. The aggregate is drawn from each bin at the pre-determined rate of flow to the dryer.

Another method is to bulldoze the aggregates against a bulkhead in which the cold-elevator feeder is located. This may be satisfactory when only two aggregates are used and both are unusually uniform in gradation.

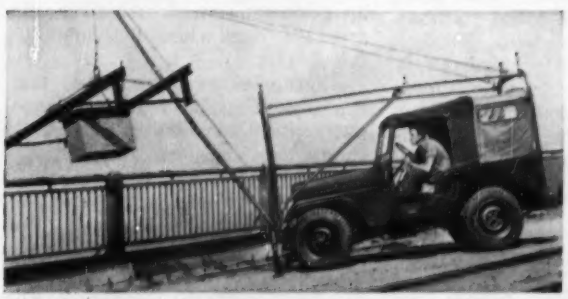
A third method is to feed from a conveyor tunnel. With this method as many sizes of aggregate as desired may be stockpiled in separate bins over a tunnel in which a conveyor belt to the dryer is placed. The flow from each bin is regulated carefully with the result that gradation of aggregate in the hot bins is uniform. Such an ar-

*(Continued on page 130)*

(Advertisement)

**Goes anywhere!** The Universal 'Jeep' is often the first equipment to reach a construction job, and the last to leave. With the extra traction of its 4-wheel drive, it takes engineers over the roughest ground for first surveys. During construction it carries men and tools wherever they are needed, on or off the road. And when the job is done, it helps speed final inspection work.

# How 4-wheel drive 'Jeep' vehicles help contractors save time and money!



**'Jeep' with hoist** lowers lighting equipment in a bridge deck installation. Because of its light weight, the 'Jeep' can haul materials over new concrete before it is strong enough to support heavy trucks.

**'Jeep' Truck** with hydraulically-operated back hoe prepares foundations, digs laterals or drainage ditches, and does other jobs too big for hand digging but too small for heavy-duty earth-moving equipment.

Vehicles in the 'Jeep' family help speed work and cut costs in almost every phase of construction.

In 4-wheel drive they go up steep grades—through mud, sand and soft earth—where other vehicles can't go. They shift easily into 2-wheel drive for travel at highway speeds. With power take-off or hydraulic lift, they operate many types of equipment from dozer blades to mobile drills for soil sampling. They stand up to the toughest usage—save you valuable time on job after job. Ask your nearest Willys dealer for an on-the-job demonstration or write for information.

The 'Jeep'®

**family of 4-wheel drive vehicles**

**WILLYS... makers of the world's most useful vehicles**

WILLYS MOTORS, INC., TOLEDO 1, OHIO

**Table 8 . . . Cold-Laid Asphalt Plant-Mix, Macadam Aggregate Type**

(Usual thickness 2 in.)

Mineral Aggregates—Crushed stone, slag or gravel

GRADATION OF AGGREGATES

| For | Mix | Seal Coat |
|---|---|---|
| Simplified Practice No. | 5 | 7 |
| Total Passing | Per Cent | Per Cent |
| 1½-in. sieve | 100 | — |
| 1 " | 90-100 | — |
| ¾ " | 40-75 | 100 |
| ½ " | 15-35 | 90-100 |
| ⅜ " | 0-15 | 40-70 |
| No. 4 " | 0.5 | 0-15 |
| No. 8 " | — | 0-5 |

*Asphalt Binder—RC-4 cutback asphalt

Proportions of Mix:
Mineral Aggregate, 94.5 to 96.5%
Asphalt Binder, 3.5 to 5.5%

APPROXIMATE QUANTITIES FOR 2 IN. COMPACTED THICKNESS

| Materials | Per Sq Yd | Per Mi, 1 Ft Wide |
|---|---|---|
| Plant-Mix Aggregate | 171.0 lb | 50.2 tons |
| Seal Coat Aggregate | 18.0 " | 5.3 " |
| Asphalt Binder (RC-4) | 1.2 gal | 704.0 gal |

*The following alternates may be used as asphalt binder:

RC-2, RC-3—Cool weather, non-absorbent aggregates
MC-3 ——Cool weather, absorbent aggregates
MC-4 ——Moderate weather, absorbent aggregates
RC-5 ——Warm weather, non-absorbent aggregates
MC-5 ——Warm weather, absorbent aggregates

**Table 9 . . . Cold-Laid Asphalt Plant-Mix (Cutback Asphalt Binder) Dense-Graded Aggregate Type**

(Usual thickness range 1½ to 4 in.)

Mineral Aggregates—Crushed stone, slag, crushed or uncrushed gravel, sand, stone screenings or mineral dust

GRADATION OF AGGREGATES

| Total Passing | % by Weight |
|---|---|
| 1-in. sieve | 100% |
| ½ sieve | 75-90 |
| No. 4 sieve | 50-70 |
| No. 10 sieve | 35-50 |
| No. 40 sieve | 20-30 |
| No. 200 sieve | 4-8 |

*Asphalt Binder—MC-3 cutback asphalt
Proportions of Mix—Mineral Aggregate, 94-96% Asphalt Binder, 4-6%

APPROXIMATE QUANTITIES FOR 2 IN. COMPACTED THICKNESS

| Materials | Per Sq Yd | Per Mi, 1 ft Wide |
|---|---|---|
| Plant-Mix Aggregate | 184.0 lb. | 54.0 tons |
| Seal Coat Aggregate | 18.0 " | 5.3 " |
| Asphalt Binder | 1.9 gal. | 1,115.0 gal. |

*The following alternates may be used as Asphalt Binder
RC-2—Cool weather mixing
RC-3—Warm weather "
SC-3—Warm weather "

## PLANT MIX PAVEMENTS . . .

Continued from page 128

rangement is particularly desirable in a permanent plant set-up because it protects aggregates from weather and reduces drying costs.

## Construction

Many contractors handicap themselves unnecessarily by paying too little attention to the location of the plant site. First of all, it must be on well-drained ground. Second, it must have plenty of room for storage. A plant turning out 1,500 tons per day requires approximately 20,000 gal, or two full railroad tank cars, of asphalt every day. Unless truck delivery on short notice is assured, storage of at least one day's supply is essential. There also must be space for storage and quick handling of aggregates.

Asphalt cements below 200 penetration should be heated at the plant to between 275 and 325 deg. The 200 to 300 penetration grade should not be heated above 275 deg, and ordinarily the temperature of the harder grades should not exceed 300 deg. Heating costs money so contractors must study the best methods of maintaining the required penetration of the asphalt cement throughout the period of use.

Cut-back asphalt binder should be heated carefully between the limits shown for the particular type and grade used. Usually this heating is by closed steam coils designed to secure uniform heating of the entire contents. Emulsified asphalt seldom requires heating. In asphalt circulation lines, the discharge should be always below the volume level of the asphalt. (See Table A for the working temperatures of asphaltic materials.)

## Preparing the Aggregate

Most aggregates should be heated to a temperature of 225 to 325 deg as discharged from the dryer. For hot-laid plant mixes produced with 200 to 300 penetration asphalt cement or with liquid asphaltic binders, the aggregate temperature should not exceed the limits for mixing temperatures shown in Table A. Aggregate for stone-filled sheet asphalt and sheet asphalt surface courses should be heated to 275 to 375 deg. Mineral aggregate is not heated and tends to cool the total aggregate slightly when mixed in.

| Asphaltic Material | Temperature (Deg) Spraying Min | Spraying Max | Mixing Min | Mixing Max |
|---|---|---|---|---|
| Asphalt Cement 200-300 pen | 275 | 350 | 200 | 275 |
| Asphalt Cement 40-200 pen | 275 | 350 | 275 | 325 |
| RC-0 cutback asphalts | 50 | 120 | 50 | 120 |
| RC-1 | 80 | 150 | 80 | 125 |
| RC-2 | 100 | 175 | 80 | 150 |
| RC-3 | 150 | 200 | 125 | 175 |
| RC-4 | 175 | 250 | 150 | 200 |
| RC-5 | 200 | 275 | 175 | 225 |
| MC-0 cutback asphalts | 50 | 120 | 50 | 120 |
| MC-1 | 80 | 150 | 80 | 150 |
| MC-2 | 100 | 200 | 100 | 200 |
| MC-3 | 175 | 250 | 150 | 200 |
| MC-4 | 200 | 275 | 175 | 225 |
| MC-5 | 225 | 275 | 200 | 250 |
| SC-0 road-oils | 50 | 120 | 50 | 120 |
| SC-1 | 80 | 200 | 80 | 200 |
| SC-2 | 150 | 200 | 150 | 200 |
| SC-3 | 175 | 250 | 175 | 250 |
| SC-4 | 175 | 250 | 175 | 250 |
| SC-5 | 200 | 275 | 200 | 275 |
| Emulsified Asphalts | 50 | 140 | 50 | 140 |

**TABLE A**
**Working Temperatures for Asphaltic Materials**

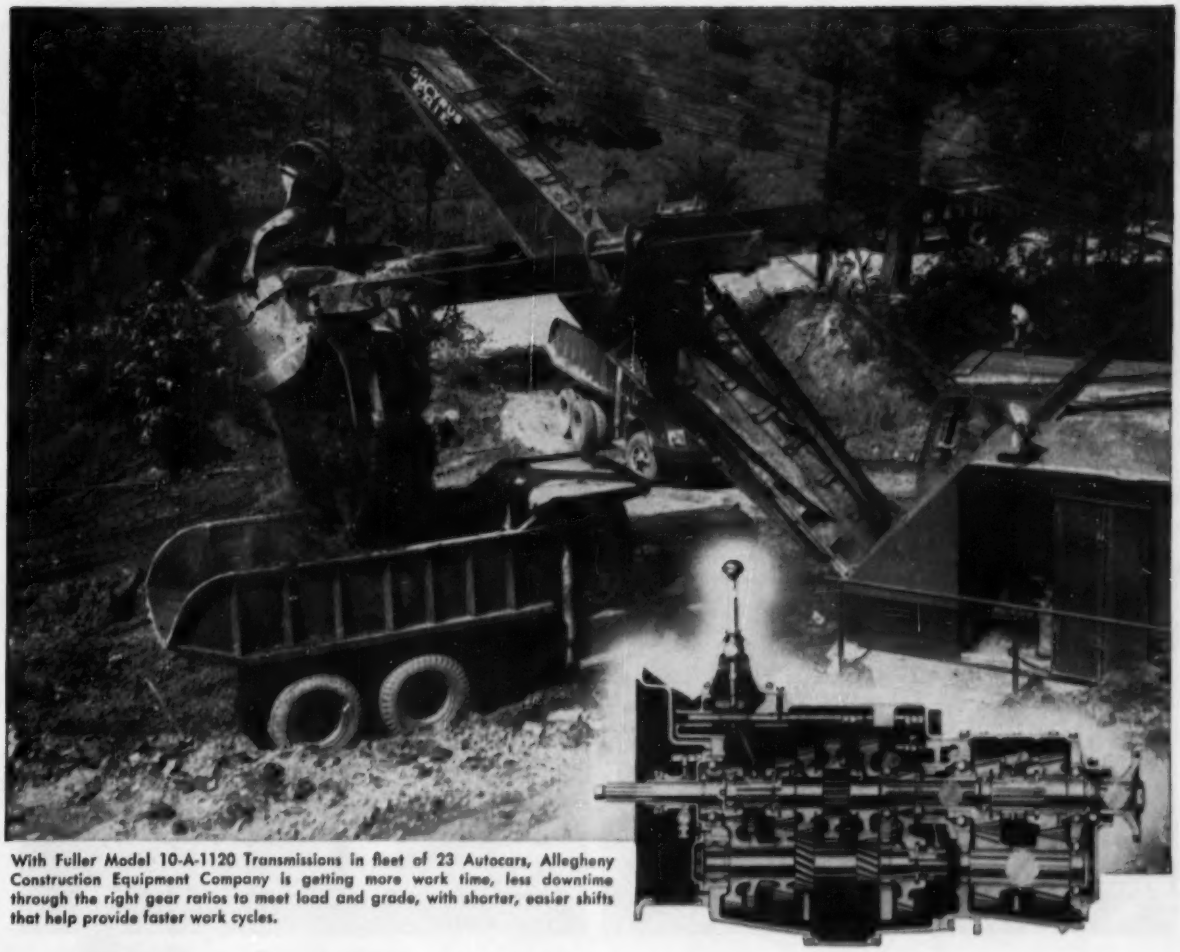
In every case the temperature should be kept as low as is consistent with proper mixing and laying. There should be an automatic recording pyrometer at the discharge end of the dryer to hold the temperature below the maximum. Over-heating wastes money.

Cold-laid asphalt plant-mixes do not require heated aggregate. Heating is used only to remove excess moisture. But for precoated macadam aggregate (Table 7), it is customary to dry, cool, and store the aggregate so that it will have a temperature of between 50 and 125 deg when delivered to the mixer.

Aggregates of mixed sizes and gradings may be fed simultaneously into the dryer, but they should be screened into suitable sizes for direct use or for recombination in definite proportions before being incorporated in the mixture. For graded aggregate mixtures, the ¼-in., No. 4, or ⅜-in. plant screens commonly are used to separate coarse and fine aggregate. For coarse graded mixtures, it is desirable to use one or more screens with larger openings so as to produce three or four sizes for recombination.

The larger the number of sizes, the less the chance of segregation. Each size of screened aggregate should be stored in a separate bin. Separate dry storage should be provided for mineral filler or hydrated lime, when they are required in the mix.

*(Continued on page 133)*



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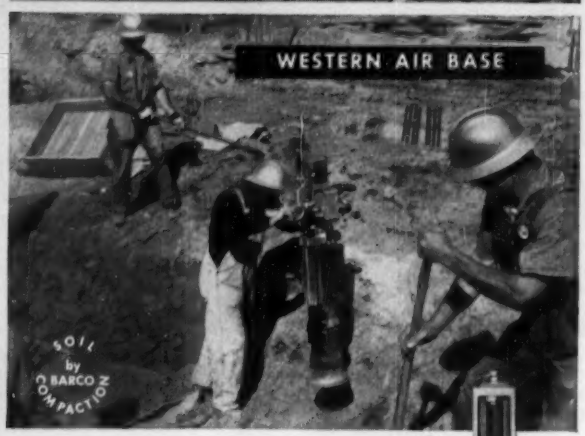
# GASOLINE **BARCO** RAMMER

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One of the biggest advantages offered by Barco Rammers is ability to handle work in minimum time. On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On trench backfill, using lifts up to 24", the rate for 18" trench is 360 to 600 feet per hour.

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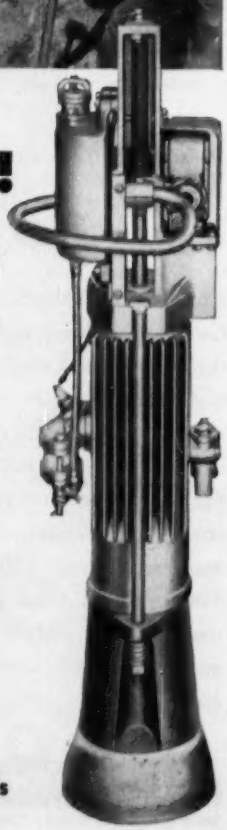

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Continued from page 130

Feeding aggregates to the dryer is very important. Very nearly the same proportions must be fed in as are called for in the final mix or some bins will be emptied, and the plant forced to stop. Efficient plants have balanced cold elevator feeds to assure proper control.

## Proportioning and Mixing

The mixer man controls batch proportioning according to a formula that gives the exact weight of each constituent used. He weighs aggregates into the hopper, beginning with the coarsest size and progressing to the finest. When the entire batch of aggregate has been weighed, he dumps it into the mixer while the blades are revolving. Graded aggregate mixtures should be dry-mixed for not less than 15 sec if mineral filler is present.

Asphalt, previously weighed, is charged into the mixer after the aggregate has been dry-mixed. Wet mixing of fine aggregates may require 30 sec or more.

Within specification limits, the temperature of mineral aggregate and mix as discharged should be so controlled that the asphalt does not tend to drain off during transportation. The mixture as received on the job must be sufficiently workable to be properly spread and compacted. When a mix is prepared in pug mill mixers, the volume of mineral aggregate and asphalt should not be so great as to extend above the tips of the mixer blades when they are in a vertical position.

In continuous mixing plants, proportioning is accomplished either by direct weighing or by volumetric measurement calibrated to a weight basis. It is necessary to synchronize aggregate and asphalt feed. This should be checked by tests before starting to produce mixtures for construction. Determination of the mixing time usually is by the weight method under the following formula:

$$\text{Mixing time (in sec)} = \frac{\text{Pug mill dead capacity (lb)}}{\text{Pug mill output (lb per sec)}}$$

The actual time required for mixing in any mixer should be studied carefully. Even a few seconds saved, consistent with proper coating, can make possible a substantial gain in daily output. There is no point in overmixing; it can be harmful. Some aggregates coat more rapidly than others. Tests will show the time needed for any particular type, and the plant should be adjusted on that basis. The cycle for a hot-mix asphaltic concrete may be completed in 45 sec in a modern plant.

**Table 10 . . . Cold-Mix, Cold-Laid Plant-Mix (Emulsified Asphalt Binder) Dense Graded Aggregate Type, Base and Surface Courses**

(Usual thickness—2-in. Base, 1—2-in. Surface)

Mineral Aggregates—Crushed stone, slag, crushed or uncrushed gravel and sand, stone screenings, quarry fines or mineral dust

GRADATION OF AGGREGATES

| Type | A | B | C | D |
|---|---|---|---|---|
| Course | Base or Binder | Base or Surface | Coarse Surface | Fine Surface |
| Total Passing | Per Cent by Weight | Per Cent by Weight | Per Cent by Weight | Per Cent by Weight |
| 1¼-in. sieve | 85-100 | 100 | 100 | — |
| ¾ " | 65-90 | 75-100 | 90-100 | — |
| ½ " | 50-80 | 60-80 | 80-100 | 100 |
| No. 4 " | 35-65 | 40-60 | 60-85 | 75-100 |
| No. 10 " | 20-45 | 25-40 | 40-60 | 45-70 |
| No. 40 " | 10-20 | 10-20 | 15-30 | 15-30 |
| No. 80 " | 5-10 | 5-10 | 5-15 | 5-15 |
| No. 200 " | 0-8 | 0-8 | 0-8 | 3-8 |

Asphalt Binder—SS-1 emulsified asphalt

Maximum Allowable Compacted Thickness, Each Layer

| Type A | Type B | Type C Surface | Type D Surface |
|---|---|---|---|
| 2-in. | 2-in. | 1½-in. | 1-in. |
| Do not belt or float to a fine finish | | May be belted or floated but not to the extent of forming a top layer of dilute emulsion instead of mortar | |

APPROXIMATE QUANTITIES FOR 2-IN. COMPACTED THICKNESS

| Materials | Per Sq Yd | Per Mi, 1 Ft Wide |
|---|---|---|
| Mineral Aggregate | 188.0 lb | 55.0 tons |
| Asphalt Binder (SS-1) | 2.9 gal | 1,702.0 gal |

## Hauling

The mix must reach its point of use in unchanged condition. Truck hauls of up to 50 miles now are common. Little segregation takes place in hot mixes if the roads are smooth. Segregation is more likely in the fluid mixes, and the design of these mixtures must be regulated accordingly.

Where long hauls are involved, suitable insulation of the truck bed will minimize heat losses in hot mixtures. A simple insulating device is a wood or metal frame fastened inside the truck body so as to provide 2 or 3 in. of air space. Except in very cold weather, heat losses on 5- to 10-mile hauls are nominal. A tarpaulin cover usually is the only precaution necessary.

Before a truck is loaded, the carrying space should be coated lightly with oil or a soap solution to prevent sticking when unloading. Large capacity trucks are desirable because they reduce delays in loading and unloading, heat loss in hauling is low, and labor cost is at a minimum.

## Spreading

Plant mixtures may be laid over any kind of stable base. When the mix is placed over untreated surfaces, the base should be primed with all it will absorb. Primer applications usually range from 0.3 to 0.5 gal per sq yd. When the mix is placed over a paved surface, what is called a "tack coat" should be applied. This seals minute cracks in the old surface and serves as a bond between the old and the new. Tack coat applications range from 0.10 to 0.15 gal per sq yd.

Asphalt mixtures usually are spread by one of two methods, depending on whether further manipulation of the mixture is required or it is to be compacted immediately. All hot-laid mixes must be

*(Continued on page 134)*

Continued from page 133

spread immediately to the proper cross section so that rolling may be completed before the mixture cools. Some cold-laid mixtures with high viscosity binders also may be spread and compacted immediately.

The mechanical spreader-finisher is used to place hot-laid mixtures. In small areas inaccessible to the machine, hand spreading is required. Mixture to be spread by hand should be taken directly from the truck or hopper or dumped outside the area on which it is to be spread.

Blade graders are satisfactory for spreading the more pliable cold-laid mixtures which require time to reach a tacky condition. But the mechanical spreader-finisher often is used for cold-laid mixtures, too. When it is, the mixture should be spread in several layers not exceeding 1 in. each to assure proper aeration before rolling.

There are two methods — the "wet" and the "dry"—for handling emulsified asphalt mixtures. In the wet method, enough water is added to the mix to give it the consistency of low-slump concrete. Such a mix can be handled exactly as a hydraulic cement mix; it can be screeded and belted or floated to very exact cross section. This method usually is preferable when the aggregate is a round gravel. For other aggregates, either wet or dry mix may be used.

In the dry method water is added to the mix only in sufficient amounts to effect thorough dispersion of the emulsified asphalt. Handling is the same as for cut-back asphalt mixtures, with spreading either by blade graders or in thin layers by mechanical spreaders.

Some cold-laid mixtures as they come from the plant do not contain enough asphalt to provide the essential waterproof condition. After they have cured, it is necessary to complete the pavement by applying a top dressing of fine-mix or a seal coat of asphalt binder.

The travel speed of the spreader-finisher depends on the character of the mix, the width and thickness of the pavement, and other factors. Usually it will be between 10 and 20 ft per min. A good machine is capable of spreading without segregation in thicknesses from ¾ in. to at least 3 in. and to a maximum width of at least 10 ft. It can be adjusted in steps of 1 ft or less to a 6-ft min width.

## Compacting

With hot-laid mixtures the operation of the plant and the time of haul should be adjusted so that the mixture is at optimum temperature for compaction as soon as it is spread. In average warm weather the optimum temperature usually is 225 to 250 deg.

Either 3-wheel rollers or those of two- or three-axle tandem type handle compaction. Initial rolling starts at the sides, running longitudinally and moving in toward the center. There should be an overlap of one-half roll width on each successive pass, and alternate trips should be of slightly different length to prevent any transverse depression. Sometimes on wide pavements it is possible to roll diagonally, but care must be taken to preserve proper crown. The few areas inaccessible to the roller must be hand-tamped. Where adjacent spreads are to be made, rolling should stop about 8 in. from the inside edge so that, when the next spread is made, the roller will overlap both spreads.

Cold-laid mixtures should not be rolled until proper curing out or setting has taken place. Pneumatic rollers are being used more and more. They most nearly simulate the action of traffic and make possible thorough consolidation of areas not soon reached by traffic. Use of pneumatic rollers also is the easiest way to eliminate "shadow spots," porous areas resulting from slight segregation. These are hard to close with steel rollers alone.

## Joints

Properly constructed plant-mix surfaces should not have visible joints once they have been under traffic. Only a reasonable amount of care is required in constructing joints, but this care is essential. To make a transverse joint, the transverse edge of the previously laid course, if it already is hardened, should be cut back to its full depth so as to expose a fresh surface. The edge should be given a thin paint coat of asphalt. Then the new mixture should be placed in contact with it and raked to proper depth and grade.

Hot smoothers or tampers often are employed, particularly with sheet asphalt pavements, to heat the old pavement sufficiently to assure proper bond. Sometimes, also with sheet asphalt mixtures, a 1½ in. canvas-covered rope is laid transversely across the pavement a foot or two from the end of the spread and rolled with the surface. When it is removed, together with the foot or two of pavement, a good vertical and irregular joint for bonding with the next spread is provided.

Longitudinal joints in coarse graded asphaltic concrete seem to give the most difficulty. This is due almost entirely to carelessness in handling the spreading operation. Even mixtures at just the right temperature tend to slope away a little at the end of the spreader screed. So, when the adjacent lane is placed, the spreader should crowd the previously placed pavement to assure a full depth of mixture. In addition, one man should be detailed to carry back from the hopper enough mix to fill any low areas and to place enough extra mix above the joint so that it will be crowded full when it is rolled.

In city work, surfaces like curbs, gutters, headers, manholes etc. should be painted with an asphaltic material before the mix is placed to assure proper bond.

## Summary

1. Conditions in which it will be used determine the best size and type asphalt plant for a particular job. The plant must be balanced in all its units to operate most efficiently with the aggregates available and under the particular climatic conditions.

2. Mechanical spreader-finishers are highly efficient machines, but, like any other machine, they wear out. Constant checking of the machine and maintaining a stock of spare parts will prevent unnecessary delays due to break-downs.

3. Care in analysis of available aggregates often will make possible considerable savings in the cost of the mix. Thorough study of the aggregate situation is essential.

4. Proper attention to making joints, particularly longitudinal joints, will avoid having areas rejected and give good-looking work.

5. Best results, as in all other paving work, are secured in warm, dry weather. Proper maintenance of equipment is essential in order to take full advantage of favorable weather conditions.

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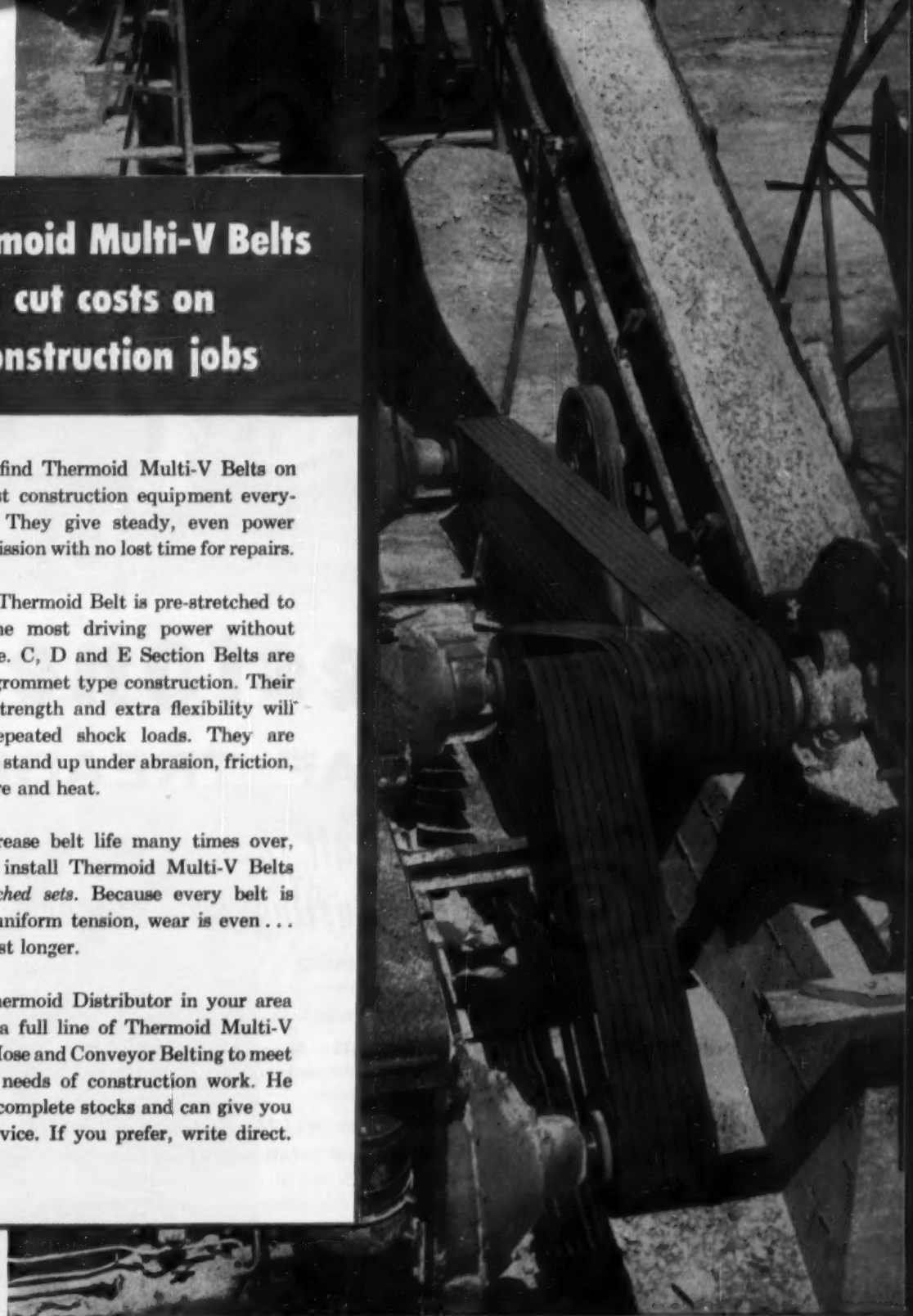
The fourth article in this series will appear in the January issue.



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## *On-the-Job*

# CONTRACTOR-LABOR RELATIONS

by LEON B. KROMER, JR.

## Watch Christmas Plans

CONTRACTORS SHOULD CHECK a number of points as Christmas approaches.

• **Holiday provisions of union contracts.** Look up your agreements to see if they provide for paid holidays. More and more, collective agreements contain clauses requiring eight hours pay for time not worked on certain specified holidays. Christmas and New Year's Day always are included. Through ignorance or oversight you may neglect to pay your employees and find yourself accused of violating the agreement. Even though the error was an honest mistake it could affect your labor relations.

Read the agreement carefully. Some holiday clauses merely set forth certain days that are to be recognized as holidays and upon which no work is to be performed. These clauses often do not provide for payment of eight hours' wages.

• **Bonuses.** You can get caught under the federal Fair Labor Standards Act (the Wage-Hour Law) in handing out Christmas bonuses unless they meet these conditions:

1. The bonus must be in the form of a gift with no relationship to hours worked or efficiency. It can be a reward for years of service, however.
2. Payment of the bonus must be discretionary with the employer. If a bonus is paid in accordance with provisions of a collective agreement, it is considered by the Wage Hour Administrator as wages. Why is this important? Because, if overtime is worked, the bonus has to be included with wages in calculating the overtime compensation.

### AFL-CIO Merger

The first joint convention of the AFL and CIO in New York this month helps point up the significance to contractors of the merger. Don't look for any drastic changes in the setup of the unions. But once the major problems confronting the building trades unions are ironed out, you can look for a stepped-up program of organizing non-union laborers and mechanics in construction. Already large equipment dealers are feeling the

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force of a drive by engineers and teamsters to organize repairmen, operators of equipment, etc.

The problems confronting the building trades unions in the merger reach to the roots of the major division between the AFL and the CIO—craft versus industrial organization of workers. In many large plants the industrial union—CIO—also represents maintenance workers who have always been claimed by the building trades. Are these workers to remain in the industrial union? Up to the present the National Labor Relations Board has refused to carve out separate bargaining units. In many cases the building trades unions have been frozen out. The wages and working conditions of the maintenance workers have been included in the industrial union's agreement with the employer.

The ground work of consolidation has been accomplished, in some areas, through cooperation between the two groups on common problems. For example, in one large industrial city the two have worked together to the extent that a strike and picket line on a large construction project within an industrial plant was "honored" by CIO plant workers. The reverse has also been true; AFL construction workers have refused to cross a picket line set up by a CIO union at a plant. This has not always been the case. In some cities today there is little indication of cooperation or understanding between unions of the two groups. In such areas the problems of merging will be much more difficult.

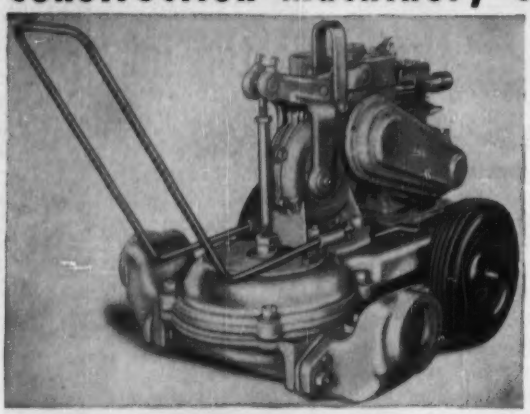
## Lathers to Return to the Joint Board?

Look for the return of the lathers international to full participation in the procedures of the National Joint Board for the Settlement of Jurisdictional Disputes. The new international president, Lloyd K. Mashburn, a former Under-Secretary of Labor, is a strong believer in negotiating a dispute—not just engaging in a slugfest. It is reported that he gave only luke warm support to the fight that culminated in a National Labor Relations Board ruling (CM&E Oct. p. 163) that slapped down the efforts of the lathers to circumvent the jurisdiction of the Joint Board. And in an out-and-out fight, the lathers would be no match for the large building trades unions that support the Joint Board.

Pending a return of this union to the Joint Board, contractors faced with jurisdictional disputes involving lathers' local unions should continue to refer them to the Joint Board. You will still get action from the Board, particularly if a jurisdictional strike is threatened. If an international union withdraws from the Joint Board, it must also withdraw from the Building Trades Department of the AFL. The agreement implementing the Joint Board was incorporated into the constitution of the Building Trades Department, and every international union making up the department is committed to uphold this constitution.

(Advertisement)

**Two revolutionary new pumps announced by Construction Machinery Company, Waterloo, Iowa**



A NEW TYPE VARIABLE-SPEED, VERTICAL-STROKE PLUNGER that assures a much longer diaphragm life and greatly increased efficiency, is a real money-saving feature of CMC'S new SKWEE-GEE diaphragm pump.

A combination 2" and 3" pumper, the SKWEE-GEE is now the best pump in the business for jobs ranging from de-watering to pumping sludge. Can't be beat for high suction lifts, seepage control, small well-point dewatering jobs.

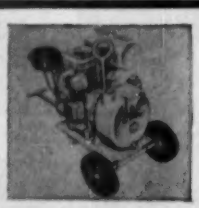
SKWEE-GEE primes dry at 25 feet. Provides total heads up to 40 feet. Standard plunger stroke 3" with alternate 2¾" by simple adjustment. Briggs air-cooled engine.

Write for Bulletin FD-L3-55. **Construction Machinery Company,** Waterloo, Iowa.

TWICE THE PRESSURE of ordinary single impeller pumps is delivered by CMC'S new and different 2-stage dual primer, Model TS-7.

A 1½" pumper with unique type impeller, it's excellent for such jobs as pumping through extended lines and washing equipment. Fine for suction lifts up to 25 feet.

Write for Bulletin TS-7, **Construction Machinery Company,** Waterloo, Iowa.



**A Complete Line of Dual Primers from 1" to 10"**

# What about hydro-flation?

Hydro-flation increases weight of 208 hp, 31,700-lb. Tournatractor by nearly 10%. Increased traction and drawbar pull, plus decreased tire slippage and decreased tire wear are the results.

Water or "hydro-inflation" of farm and industrial tractor tires is an old and accepted practice. In the last few years, it has been tried extensively in self-propelled scrapers and big rubber-tired tractors, too. While all the benefits and possible faults are not yet known for dirtmoving uses, certain obvious advantages make it worth your careful consideration.

### Measures weight and traction

Biggest advantage is that hydro-flation greatly increases the weight —and the traction—on drive wheels. For example, hydro-flation alone increases the weight of *one* 16-ply 21:00 x 25 tire — 700 to 1,400 lbs.

If you hydro-flate the 4 tires of a LeTourneau-Westinghouse Tournatractor in this way, you add up to 5,600 pounds to its working weight. Even allowing for greater rolling resistance (due to the added weight), your drawbar pull is increased by 3,100 lbs.

Hydro-flating the drive tires of other earthmoving equipment increases drawbar by similar margins. And, because the solution counterbalances as the wheel rotates, you lose practically no power on the haul. Hydro-flation also cuts slippage and tread wear, and reduces need for frequent re-inflation due to pressure loss.

With valve stem in top position, fill tire with solution up to level of valve stem. Tire will then be filled to within approximately 75% of capacity. Complete inflation to manufacturer's recommended pressure with air.

### Calcium chloride prevents freeze-up

The liquid usually used for hydro-flation is either plain water or a mixture of calcium chloride and water. Because the calcium chloride readily dissolves, it has the advantage of increasing weight without increasing volume. The calcium solution will not freeze, even in sub-zero temperatures, and it will not injure rubber.

### Simple to do

Hydro-flation is simple. First, thoroughly mix the calcium chloride with water. Follow recommendations of the tire manufacturer—usually three to five pounds of the chemical are added to each gallon of water. Next, jack up wheel of machine to remove all weight from tire. Then, rotate tire until valve stem is at top and perpendicular to ground. Remove as much air as possible. Attach nozzle of hydro-flater to valve stem. Remaining air will escape as solution is pumped in.

When solution reaches valve stem level, remove nozzle and inflate tire with air to manufacturer's recommended pressures. On construction equipment, tires should not be filled with liquid above 75% capacity. Valve should be at highest position when checking air pressure.

One word of caution if you use the recommended calcium chloride solution instead of just water . . . be sure to obtain tubes with special rubber-sealed base valves. This type valve will prevent separation of the rubber valve base and the metal. Special corrosion-proof gauge should be used for checking pressure, too. Equipment for the liquid inflation can be obtained from an agricultural implement dealer or any large tire distributor or dealer.

Tournatractor—Trademark Reg. U.S. Pat. Off.
G-740-OP-bww

*Free copies of this article can be obtained by writing LeTourneau-Westinghouse Company, Peoria, Illinois. Please state quantity desired.*

LeTourneau-WESTINGHOUSE Company
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company

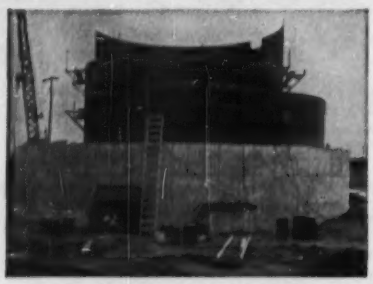
(Advertisement)

## Prefabricated Form System Used For All Types of Construction

**Saves Time . . . Labor . . . Material**

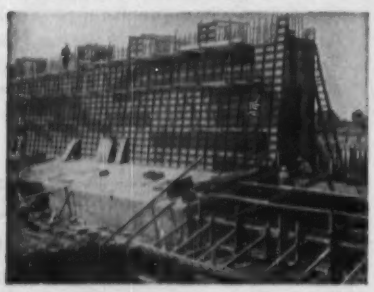
UNI-FORM Concrete forms are widely used in all types of concrete construction because they provide contractors with three important advantages: (1) Increased labor productivity — forming crews can erect more contact area per man hour; (2) Guaranteed material and labor savings and (3) Complete flexibility of application.

Simple mechanical assembly of plywood faced, steel-framed UNI-FORM Concrete Forms permits any labor force to become expert in a short time. All forming requirement — inside corners, outside corners, pilasters, one-side alignment and bracing, automatically accurate wall widths, scaffolding, etc. are engineered into, and provided with, the UNI-FORM System.



Circular wall formed with UNI-FORM Panels

Contractors using the UNI-FORM System have the basic equipment to handle any type of concrete construction. Complete engineering service . . . job analysis, forming recommendations, bills of material and forming details, together with field service are available to contractors through the manufacturer, Universal Form Clamp Co., Chicago, or through any of the company's many Distributor or Branch Offices.



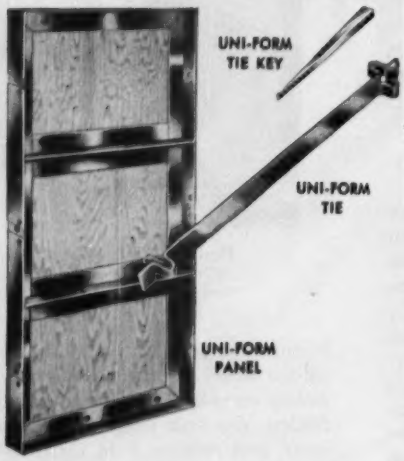
Battered wall forming with UNI-FORMS

A complete catalog, describing the UNI-FORM System of Wall Form Construction is available upon request. Write: Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Ill.

# UNI-FORM Concrete Forms

**SIMPLE . . . FAST . . . FLEXIBLE**

## 3 BASIC ELEMENTS mean Faster, Easier, More Accurate Forming




**Simple mechanical assembly of UNI-FORM Concrete Forms provides faster forming . . . easier stripping and lowest all around costs. Ready to use when they reach the job, UNI-FORMS guarantee time, material and labor savings on any forming job. Let us prove UNI-FORM advantages . . . send us a set of prints for free recommendation and proposal on your next job. There's no obligation.**

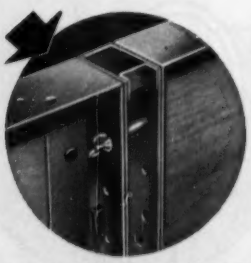
## FORM CIRCULAR WALLS AT LOWEST COST

- **No alignment or bracing on outside.**
- **Minimum excavation required.**
- **Free working area.**
- **Maximum job safety.**

**UNI-FORMING Circular walls costs less per square ft. of contact area . . . provides unhampered steel setting . . . greater control of concrete placement. Write for details on UNI-FORMING circular walls.**

### PREFABRICATED CIRCULAR WALL FILLER

**Used on outside form only . . . assures true form curvature with standard UNI-FORM Panels.**



**RENTED...SOLD...RENTED WITH PURCHASE OPTION**

**UNIVERSAL FORM CLAMP CO.**

GENERAL OFFICES AND FACTORY: 1238 N. Kostner • Chicago 51, Illinois

OFFICES AND WAREHOUSES:
CLEVELAND OHIO • BALTIMORE MARYLAND • HOUSTON, TEXAS
SAN LEANDRO, CAL. • LOS ANGELES, CAL. • ATLANTA, GA.

*SERVICE WHEREVER YOU BUILD... COAST TO COAST*

DISTRIBUTORS IN PRINCIPAL CITIES

Mr UNI-FORM

Copyright 1955 by UNIVERSAL FORM CLAMP CO., Chicago 51, Ill.

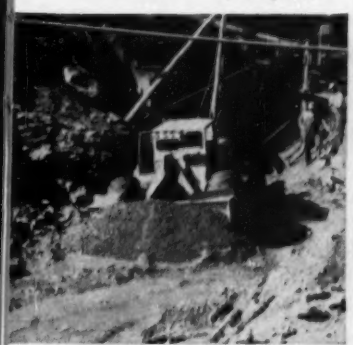
# HOW 1 tractor handles 8 jobs every 8 hours

**8:00 A.M.** Tournatractor cleans up around shovel in ore pit...

These on-the-job photos show how Tournatractor's 19 mph "run-about" ability can help you maintain steady production.

At this plant in the iron range in Minnesota, Tournatractor's main job is cleaning around the shovel. It uses normal waiting periods to maintain the rock dump... clean spillage at the crushing plant... feed material from surge pile to hopper. Tournatractor is also ready at a moment's notice to clear second-growth timber or to "lend a hand" when the crusher plant crew makes screen adjustments. In its spare time, Tournatractor builds and maintains haul roads, handles clean-up around the plant, improves drainage, cleans banks of washed-in spoil, levels for drill moves and set-up. It travels to each assignment, finishes it, gets back to the shovel FAST.

If *your* work includes a lot of widely-scattered dozing and hauling jobs—cleaning around shovels and at dumps, push-loading scrapers, plowing snow, or clearing land—you'll want to know more about Tournatractor. Let us show you how 1 of these tractors-on-rubber can do the work of 2 or 3 tractors-on-crawlers. Write or call soon!



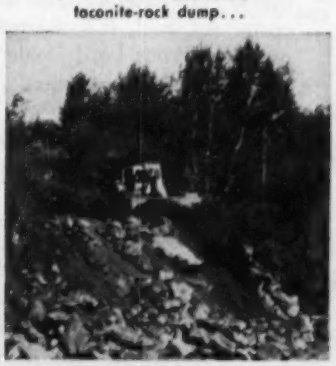
**8:48** Travels .4 mi. to crusher, cleans up drain spillage.

**9:25** Runs .2 mi., and levels taconite-rock dump...

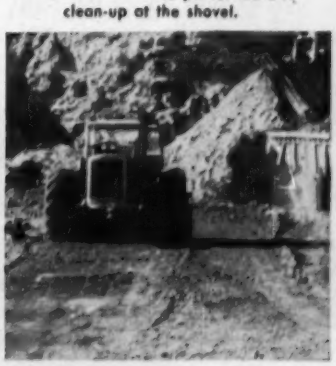
**9:34** Returns .6 mi. to pit for more clean-up at the shovel.

**11:45** Drives .4 mi. to help crew adjust screen at crusher.

**11:55** Feeds material from surge pile to hopper at crushing plant.



**12:20 P.M.** Speeds .2 mi. back to rock dump for more leveling...



**12:25** Drives .6 mi. to pit, cleans up again around shovel...

**3:45** Goes .4 mi. to surge pile, feeds hopper. Next shift, 4:00 to 12:00.

Tournatractor—Trademark Reg. U.S. Pat. Off. T-695-G-b

LeTourneau-WESTINGHOUSE Company
Peoria, Illinois
*A Subsidiary of Westinghouse Air Brake Company*

(Advertisement)

# '56 Ford valve advancements for extra-long truck engine life!

**Sodium-cooled valves that operate up to 225° cooler among the many new durability features**

Every 1956 Ford Heavy Duty Y-8 engine brings you a *combination* of long-life features available in no other trucks.

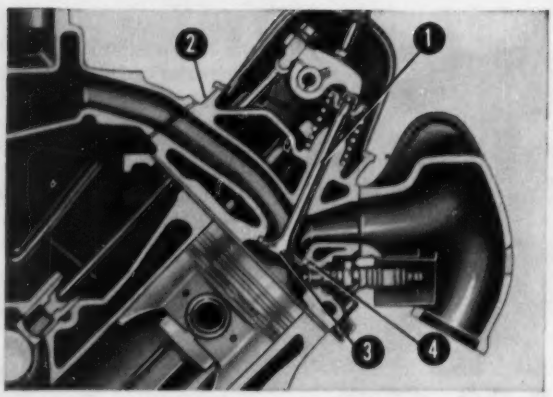
The long life of these new engines (offered in all Series 600 and larger trucks) begins right with the basic engine structure—the block.

Compared with ordinary V-8's, Ford's *Y-8* engines have a deeper, more rigid block. This extra depth holds main bearings in more precise alignment and gives the crankshaft better support.

**Stress-relieved cylinder heads** are specially heat treated to resist warping. As a result, the heads remain "true" and valves retain their precise fit. Also, there's less chance of compression leaks around the heads. Gaskets stay on the job much longer—reducing truck down-time.

**Sodium-cooled exhaust valves** play a major part in slashing upkeep costs. Instead of having solid stems as ordinary valves do, the stems are hollow and partially filled with powdered sodium. Under heat, the sodium *turns into a liquid*. This liquid carries heat *away* from the valve heads far faster than solid stems do. Valves run up to 225° cooler, *last far longer*.

But even the best valve won't do its job right unless it closes against an equally durable seat. That's why Ford sodium-cooled exhaust valves have superhard alloy seat inserts.




**1**—Sodium-cooled exhaust valve **2**—Stress-relieved cylinder head **3**—Tungsten-cobalt alloy valve facing **4**—Tungsten-cobalt alloy seat insert.

**Solid tungsten-cobalt alloy seat inserts.** These special inserts are highly resistant to heat and wear. And, for still greater mileage before valve regrinding, exhaust valve heads also are faced with tungsten-cobalt alloy.

Other Ford Heavy Duty features include self-sealing, dish-shaped intake valves that seat tightly under extreme heat conditions . . . full-flow oil filter to clean *all* the oil and cut engine wear . . . and special long-life copper-lead bearings.

These and still other Ford features help keep engine efficiency at its peak for many more miles. They extend engine life and cut maintenance costs. All told, it's a combination you can get *only* from your Ford Dealer. Be sure and see him before you buy your next truck.

**New Ford Big Job**—the '56 T-800 with new carrying and earning power. Choice of two Heavy Duty engines: new 190-h.p. Y-8 . . . or new 200-h.p. Special Y-8 with exclusive hood air scoop, 4-barrel carburetion and dual exhausts. New tubeless tires, tachometer and *Power Steering* are standard. Big new 42,000-lb. GVW—new 65,000-lb. GCW.

Five to 6 passes by the 1¾-yd. shovel fill Rear-Dump to heaped capacity. In making change-over from scraper to rear-dump, same tires, wheels, brakes, and controls are used.

# Alabama contractor shows how to get "double value" from each dollar of equipment investment

"Interchangeability" has a powerful meaning to Clyde O. Mitchell, Birmingham. It's the way he assures himself "double value" from his versatile C Tournapulls.

For dirtmoving, Mitchell hitches 14-yd. scrapers behind his 2-wheel "C" prime-movers. Whenever he encounters shovel rock, he switches scraper bodies for rear-dumps to handle this problem. The ability to switch to rear-dumps eliminates added ownership or rental expense of trucks, reduces maintenance cost as well as equipment and parts inventory, and permits operation under weather and haul road conditions that would shut down truck operation.

### Double duty means added profits

Mitchell has made extra profits twice so far on important jobs because of this quick-change feature of his C Tournapulls.

First double-duty assignment was a state highway improvement job at Decatur, Alabama. On this job, the scrapers handled 800,000 yds. of dirt, while Rear-Dumps moved 100,000 yds. of rock.

Recently he relocated and straightened 4.1 miles of State Highway 431 between Attalla and Boaz. Here, of the 486,000 cu. yds. of material to be moved, about 16% was rock, 75% chert, and 9% clay. The dirtmoving was handled by two C Tournapulls with Scraper, three 18-yd. tractor-drawn FP scrapers, and three self-propelled scrapers of another make. The Tournapulls were then equipped with Rear-Dumps to haul rock . . . about 78,000 yards.

### 4200′ cycle every 6 minutes

Time studies show the Tournapull Rear-Dumps are real producers. With wide, easily entered bodies, they were loaded with 10 pay yards by a 1¾-yd. Lorain shovel in an average of 1 minute, 40 seconds. Working 4200′ cycles, each round-trip took only 6 minutes. Haul and return speeds averaged 12 mph. Hourly output for the 2 machines was 180 pay yards per 55-minute hour.

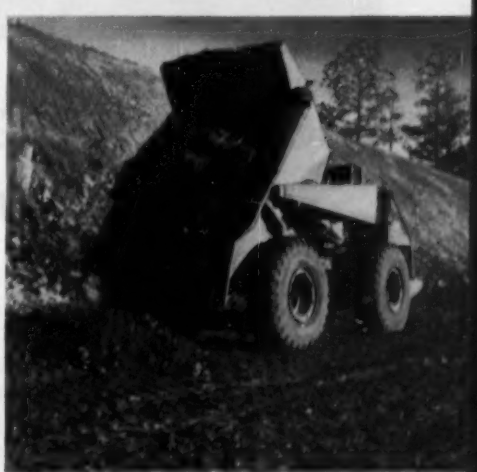
### More speed on long hauls

This kind of production and Tournapull interchangeability highly pleases the owners. Says Supt. G. M. Wakefield: "I like the C Tournapull prime-mover. It's got a good scraper and rear-dump. It will stand up against any dirtmover."

Adds operator C. L. Moore: "The Tournapull can turn everywhere, and it's got more speed on long hauls. It's simple to understand . . . easier to operate than other rigs."

Figure out for yourself on the basis of cost alone the extra value of Tournapull interchangeability. An additional haul unit costs about 25% of the total initial price of prime-mover and original haul-unit combination. Interchangeable haul-units can be purchased at any time.

Find out how this double-duty equipment can give *you* double earning power for every dollar of investment. For more facts and owner-verified case histories, write or phone today.



Dumping on the run, Rear-Dump builds subgrade in cut where rock has been removed. Average dumping time was about 20 seconds. Electric controls respond instantly for steering and controlled dumping.

Tournapull—Trademark Reg. U.S. Pat. Off. R-801-H-b

**LeTourneau-WESTINGHOUSE Company**

Peoria, Illinois

*A Subsidiary of Westinghouse Air Brake Company*

# LIGHT, RUGGED AMSCO® DIPPERS deliver more loads per shift

The all-cast Amsco dipper is made of the toughest steel known . . . manganese steel. Amsco dippers withstand rough handling, sharp impact and grating abrasion because of this same sturdy construction. And all dipper segments are plug-welded together, adding strength without increasing weight.

Notice the raked design . . . those sharp, fanned teeth bite out a capacity load every time. Dumping is instantaneous, because the dipper bottom has a larger opening than its top. And there are no snagging edges or cavities on the interior to collect clods and lower loading capacity.

Specify these light, rugged, Amsco dippers to get more bite and higher loading into the working end of your dipper sticks. You'll get more digging done in less time at no increase in power load. Specify Amsco manganese steel, too, for other parts that must be *extra tough*.

AMERICAN Brake Shoe COMPANY

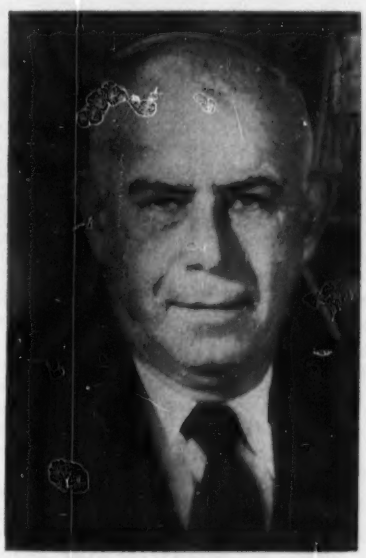
**AMERICAN MANGANESE STEEL DIVISION**
**Chicago Heights, Ill.**

# Construction Men in the News...

**A. I. SAVIN** (left) has been elected a vice-president of Merritt-Chapman & Scott Corp. MC&S also established a Boston area construction department office to be headed by vice-president CHARLES A. RICHARDSON.

Savin is president and treasurer of Savin Construction Corp. and its subisdiary, the Whaling City Dredge & Dock Corp., which were absorbed by MC&S in August and operate as divisions of the company's construction department.

Richardson has been in charge of the New York Marine & Heavy Construction division for the past three years. He will be succeeded in that post by his former assistant, FRANK R. CREEDON.



**MORRIS GOODKIND** recently retired as Director and Chief Engineer, the New Jersey State Highway Dept., was honored last month with a testimonial dinner given by the Associated General Contractors of New Jersey.

Goodkind was awarded a bronze plaque by the New Jersey State Employees Award Program for "distinguished services rendered as director and chief bridge engineer" and "in recognition of his contributions to the advancement of the engineering profession."

Goodkind had been with the state highway department since 1922. For his curving series of white concrete arches across the Raritan River, Goodkind won the Phoebe Hobson Fowler Prize, awarded by the American Society of Civil Engineers, in 1930 for "the most beautiful engineering structure erected anywhere that year."

**LAWRENCE R. REDDING** has been named by George A. Fuller Co. as superintendent for construction of New York's newest skyscraper—the $20 million, 38-story Seagrams Building.

Redding was Fuller's superintendent for construction of the United Nations Headquarters in New York City, the DuPont Building, Miami, Fla., the Coast Guard and Maritime Training Station, Brooklyn, N.Y., and the Caribe Hilton Hotel, Puerto Rico.

A native of Delphi, Ind., he began his construction career in 1925 as a carpenter.

**NICHOLAS P. OGLESBY** has been appointed chief of the construction equipment section at the Corps of Engineer's Research and Development Laboratories, Fort Belvoir, Va.

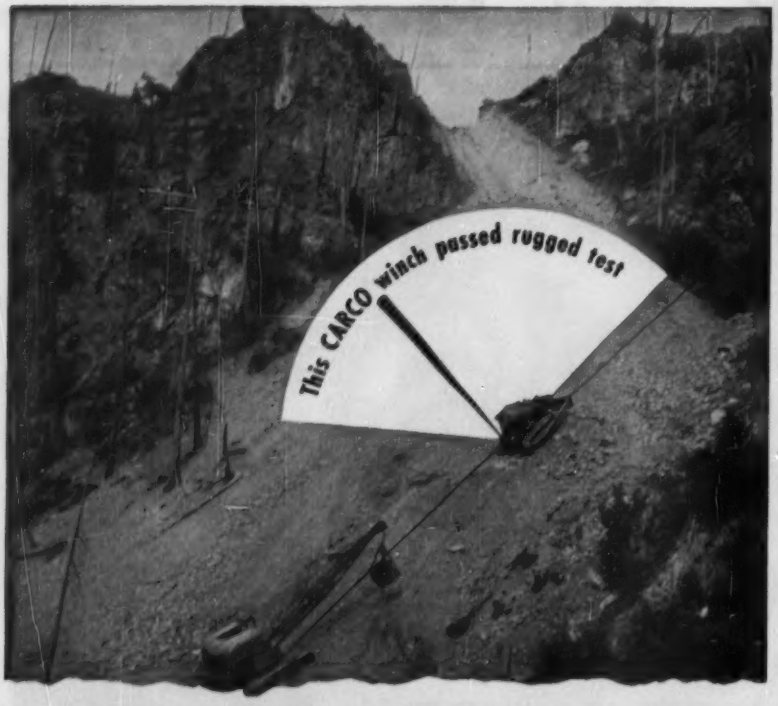
Oglesby served as test engineer and later as project engineer prior to his appointment. A native of Wytheville, Va., he attended the Virginia Military Institute and Catholic University.

**GEORGE A. LINDQUIST** has been named construction manager of the 10-state western district of H. K. Ferguson Co., Cleveland, Ohio. Lindquist, who will make his headquarters in San Francisco, served as project manager on some of the company's largest jobs, including the $20 million Imperial Chemical plant at Kingston, Ontario. He has been with the company for 30 years.

**Rear Admiral ROBERT H. MEADE,** deputy chief of construction for the Navy's and Air Force's Spanish base program, has been named chief of the Bureau of Yards and Docks. He succeeds Rear Admiral J. R. Perry who died in September ber.

Admiral Meade brings with him as the bureau's new chief an extensive background in naval public works construction. While in the Pacific, during World War II, he was commander of the Seventh Construction Brigade and, later, senior brigade commander of the Second and Seventh Naval Construction Brigades.

Admiral Meade had been assigned to the Bureau of Yards and Docks for nearly five years prior to assuming his duties in Spain.




# CARCO winches held fast when slippage meant disaster

**...on tough Alberta to Vancouver pipeline job**

Towing and holding heavy equipment on steep grades is a severe test of a winch brake. On the Model J Carco winch, the automatic, self-energizing brake will hold any load the winch can pull. It takes hold the instant tractor clutch is disengaged. Full braking power comes from high ratio leverage contracting the band on brake drum. Brake unit is reversible, permitting under- or over-wind free-wheeling. Brake release mechanism gives the operator complete load control at all times. The load can be checked at any point and even be "inched" down. Brake is enclosed, protecting it from the elements or external abuse.

Mr. G. T. Guest, Assistant to Project Manager of Comstock Midwestern, Limited, builders of "Big Inch-by-Inch", says, "The job needed Carco winches for towing and holding heavy machinery on steep grades and even for holding men by life lines. Had a single winch failed, men and machinery would have been lost. We found Carco winches equal to everything we asked of them."

On top of hill a Model J Carco winch is winching the Carco J winch and International TD24 shown above up steep slope at Coquihalla Canyon while it, in turn, is winching up clam digger.

You can expect greater value from the leading producer, and get it from Carco, first in winch production. PACIFIC CAR AND FOUNDRY COMPANY, Renton, Wash. Branches at Portland, Ore., and Franklin Park, Ill.

50th ANNIVERSARY PACIFIC CAR AND FOUNDRY COMPANY

CARCO®

**WINCHES**

*FOR ALL INDUSTRIAL TRACTORS*

# SALES AND ★SERVICE★

**News of manufacturers' activities designed to assist the reader in the purchase of machinery, equipment and materials and help him obtain quick service on parts and maintenance.**

## Distributor Appointments

**Bucyrus-Erie Co.:** Syracuse Supply Co., Syracuse, N.Y., now offers sales and parts service for Bucyrus-Erie excavators and cranes in the central New York area. Their territory extends from the Pennsylvania border to the St. Lawrence River. The firm will handle the full line of ⅜- to 4-yd convertible excavators and cranes, as well as Transit cranes, the truck-mounted Hydrocrane and Hydrohoe, and Bucyrus-Erie dragline buckets.

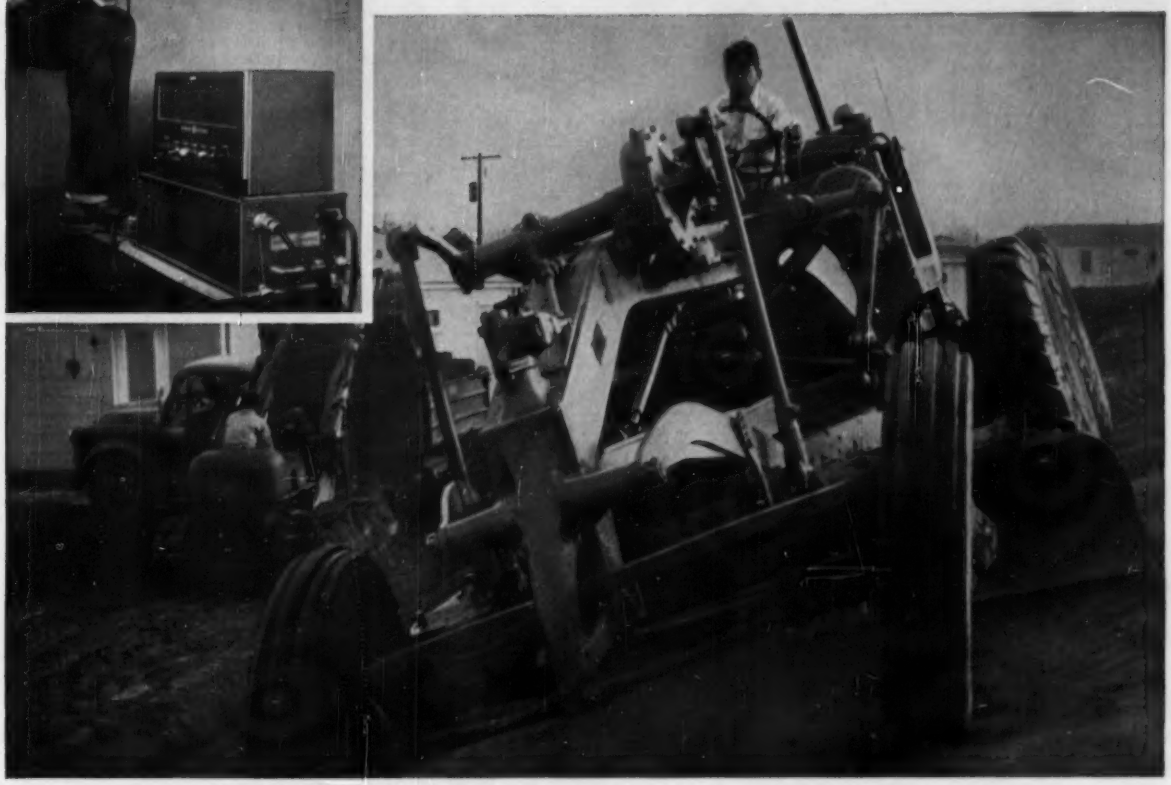
**Clark Equipment Co.:** The Automotive Division has named four new distributors to handle the Clark line of transmissions, tourque converters and axles. John M. Shank Co., White Bear Lake, Minn., will handle the Clark line in Minnesota, Wisconsin, Nebraska, Iowa and the upper peninsula of Michigan. H. A. Davis Power Equipment Co., Dallas, Texas, will handle the northern half of Texas. Brunken Corp., Ashtabula, Ohio, will cover the New England states, New York, New Jersey, eastern Ohio, Pennsylvania, Delaware, North Carolina, South Carolina, Virginia and West Virginia. In the provinces of Ontario and Quebec, Clark will be represented by Richler Bros. of Montreal and Toronto. Clark's Transmission Div. has announced the appointment of Donald E. Stoops as manager of distributor sales. He will continue to supervise the advertising and merchandising program.

**Pioneer Engineering Works, Inc.:** Finn Machinery Co., Orlando, Fla., has been named distributor by Pioneer, a subsidiary of Poor & Co., Chicago. Finn's territory will be the Florida counties east of and including Gadsen, Liberty, and Franklin and north of and including Sarasota, DeSoto, Highlands, Osceola and Brevard.

**K-G Equipment Co., Inc.:** The manufacturers of precision welding and cutting equipment announce the appointment of the following distributors: Gordon's Welding Supply Co., Glen Falls, N.Y.; Joseph Hurwitz Co., Butler, Pa.; Temple Iron and Metal Co., Temple, Texas; Travis Welding Supply Co., Dallas, Texas; Welding Sales Co., Orange, Conn.; and WP-RS Mars Co., Duluth, Minn.

*(Continued on page 149)*

# CONSTRUCTION BOSS CUTS TIME AND TRAVEL AT LEAST 50% WITH 2-WAY RADIO



**BILL BLAKE OF HODGSON-BLAKE, INC.** maintains constant contact with every construction job, from his office—or his car—using General Electric 2-way radio.

**WITH 2-WAY RADIO** installed on his grader, foreman Carl Richardson supervises work crews while operating the grader, yet is never out of touch with manager Blake and the office.

"I drive less than half the miles, yet have far greater control over all my crews, all over the *county*, since installing our General Electric 2-way radio system," reports Bill Blake, Vice President of Hodgson-Blake, Inc. of Montgomery, Alabama. "With radio in my car, I am never out of reach either by my crew foremen, or the office."

Here is another big advantage of radio—when construction equipment breaks down, you can order repair parts instantly over the air! Men and equipment go back to work quicker, saving you money by reducing idle waiting time to a minimum. G-E 2-way radio performs dependably through emergencies—is engineered to withstand the severest tests of weather, dust or shock.

Thousands of users like Bill Blake have learned that G-E 2-way radio is built to last—every tube, every component designed for full time dependability. Write today for full details on the latest in 2-way radio design . . . G.E.'s new Progress Line. *General Electric Company, Section X98125, Communication Equipment, Electronics Park, Syracuse, N.Y.*

2-WAY MOBILE RADIO

FREQUENCY STABILITY & SELECTIVITY guaranteed for life!

*Progress Is Our Most Important Product*

GENERAL ELECTRIC

Paving operations near Allentown. Contractor for this section is John H. Swanger, Inc., Lancaster, Pa.

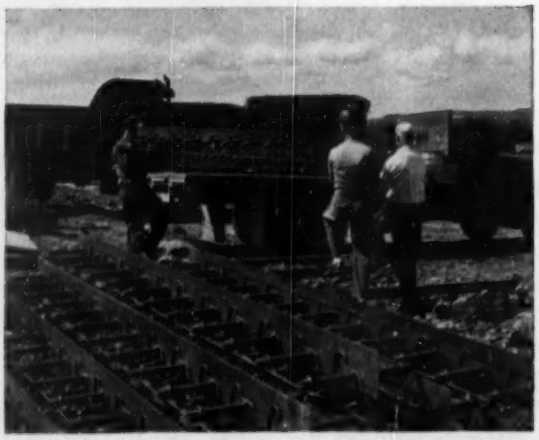
# Pennsylvania Turnpike Heads North

The port and industrial facilities of Philadelphia are being linked to the anthracite coal regions and the Pocono Mountain resort sections to the north by the 110-mile-long Northeastern Extension of the Pennsylvania Turnpike.

Beginning at Plymouth Meeting near Philadelphia, the new extension will by-pass major communities and push north to Scranton to a junction of U. S. Routes 6 and 11. Eventually the highway will be extended to the New York State line.

The Northeastern Extension will be a 4-lane limited-access dual highway. Lanes will be 12 ft wide with a 10-in. concrete slab.

Bethlehem, which is well-represented on all sections of the Pennsylvania Turnpike, is supplying dowel units, reinforcing steel, bar mats and other highway steels for the road bed. In addition, Bethlehem structural shapes are being used in the construction of bridges and over-passes, and Bethlehem guard rail will protect motorists and truckers along many miles of the superhighway.



Light-weight, easy-to-handle Bethlehem dowel units are unloaded from truck.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

**BETHLEHEM STEEL**

BETHLEHEM STEEL

## SALES AND SERVICE . . .

Continued from page 146

**L. A. Young Spring & Wire Corp.:** The appointment of Richard J. Rayback as general sales manager of Ottawa Steel Division has been announced. A front-end loader, backhoe digger and Hydra-hammer are included in a line of hydraulically operated implements produced by Ottawa.

### On the Sales Front

**All-State Welding Alloys Co., Inc.:** Charles Brown has been appointed manager of new southern division office. He will have supervision of All-State regional offices at New Orleans, St. Louis, and Concord, Tenn.

**Syntron Co.:** Syntron Buffalo Sales Co. has named R. L. Patterson, formerly manager of gasoline hammer sales at the Syntron Homer City plant, to their sales staff. Earl K. Gardner has recently been appointed district manager of the Syntron Pittsburgh Sales Co., South Charleston, West Virginia. He will handle the sales of vibratory equipment, power tools, shaft seals and heating elements in West Virginia and Virginia.

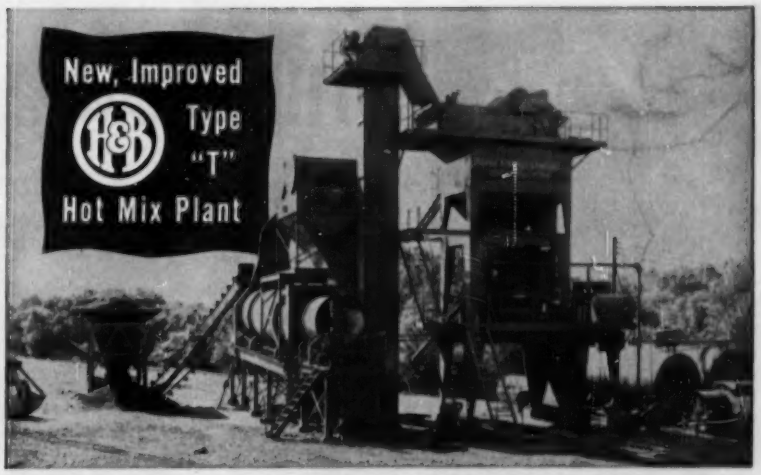
**D-A Lubricant Co., Inc.:** The manufacturers of heavy-duty lubricants have appointed R. W. Spratlin as district sales representative for Oregon and Idaho. He will make his headquarters at Portland, Oregon.

**Le Roi Div., Westinghouse Air Brake Co.:** Headquarters for the southwestern sales region will be located at LeRoi's new branch plant in Tulsa, Okla. In addition to sales facilities, the new plant also offers a replacement parts store, and complete service facilities.

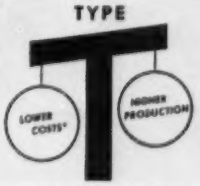
### In the Main Office

**LeTourneau - Westinghouse Corp.:** Howard R. Meeker, chairman of the board, has announced his retirement, effective Jan. 1, 1956, according to E. O. Boshell, chairman and president of Westinghouse Air Brake Co. Mr. Meeker, associated with the J. D. Adams Co. for 41 years, became board chairman of the LeTourneau-Westinghouse Co. when that organization acquired Adams early this year.

**Worthington Corp.:** George F. Habach, manager of the Harrison Division, was elected vice-president in charge of engineering. He succeeds Harry A. Feldbush, a veteran of over 40 yr with the corporation, who will continue on the technical staff as consultant on special engineering problems. Habach will assume executive responsibility for Worthington's engineering activity, including research and development.


# Increased Production—Lower Maintenance Costs




*Both original and maintenance

**New Structural Design**—All-welded bent plate construction.

**Flat Screen**—Adequate screening area on all sizes.

**Self-Contained Dust Bin**—Empties directly into weigh box, eliminating screw conveyor.

**Trunnion Roll Drive**—on dryer, eliminating vibration and reducing maintenance costs.

The new H & B Type "T" incorporates, in the basic plant, all of the major improvements of the past 20 years. New structural design and many exclusive features combine to make a plant that has already established outstanding records in both production and maintenance.

In addition to the features listed at the left, air controls and self-contained overflows are standard equipment on all Type "T" plants. No loose pieces to move or erect. 4 sizes—from 25 tons to 160 tons per hour—to meet your requirements. Available with electric, Diesel electric, Diesel or gasoline power. Factory wired plants available when electric power is used.

For specifications and complete information, write for Bulletin T-54.

**HETHERINGTON & BERNER INC.**

*Engineers • Manufacturers*

735 KENTUCKY AVENUE • INDIANAPOLIS 7, INDIANA

# BIG HELP... costs so little!*

## MILLER Tilt-Top!

* Model "B" 10 Ton $1175.*

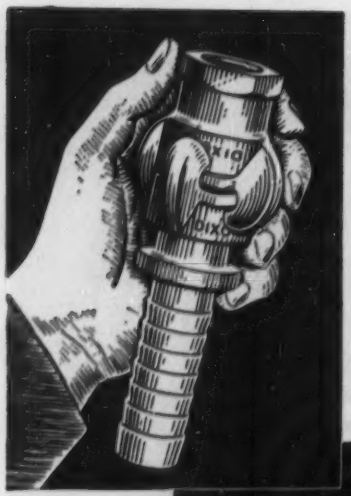
Optional equipment (priced extra): 16' long platform (8 x 14' standard) Hydraulic tilt control, 2 speed hand winch and electric brakes.

*FOB Milwaukee, Plus 8% Federal Tax

With this big Tilt-Top, ONE man can load, or unload in less than TWO minutes! It cuts your loading time ups your PROFIT time. Get this big help now it's built to last, yet volume priced for less!

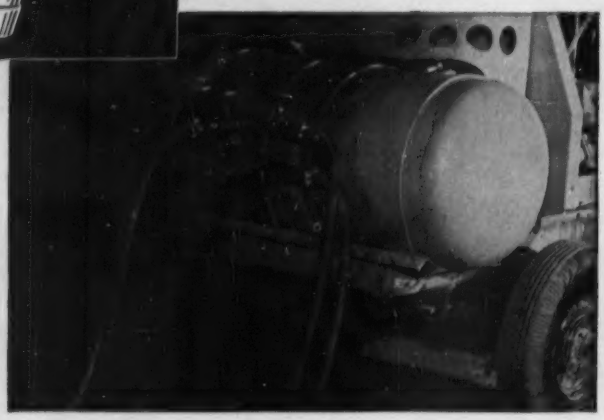
**Miller Tilt-Top Trailer Co.**

S. 92nd St., Milwaukee 14, Wis.



# THIS *Versatile Coupling*

**while used primarily for air-operated tools in field and factory, is equally efficient for water, oil and spray service. Illustration shows hose end and female I.P.T. end connected.**



# "AIR KING" *Quick-Acting Universal* HOSE COUPLING

The "AIR KING" will reduce operating costs on every job requiring quick connection. Heads are locked by simply pressing together and giving one a quarter-turn. These locking heads are identical for all sizes of hose or threaded ends, permitting the coupling of any two sizes of hose, or hose and pipe, within the "AIR KING" size range. Equipped with patented safety locking device. Available in bronze or rustproofed malleable iron, in sizes up to 1".

Two Hose Ends Connected

Male I.P.T. End

*Stocked by Manufacturers and Distributors of Industrial Rubber Products*

**DIXON** *Valve & Coupling Co.*

GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.—BRANCHES—CHICAGO BIRMINGHAM • LOS ANGELES • HO[illegible] • DIXON VALVE & COUPLING CO. LTD., TORONTO

ASSOCIATE COMPANIES—TUCK IRON COMPANY, INC., QUAKERTOWN, PA. • PRECISION CROWN STEEL COMPANY, CAMDEN, N.J.


## SALES AND SERVICE . . . Continued

**LeCrosse Trailer Corp.:** Francis J. Duffy, active with the company since 1929, has been elected president to succeed William F. Funk, who has announced his semi-retirement after 64 years of association with LeCrosse. Funk, who recently celebrated his 85th birthday, will continue as chairman of the board.

## Special Mention

**Thor Power Tool Co.:** A construction equipment division has been formed as an autonomous unit within the company to concentrate on development, production, and sales of equipment for the construction industry. It will supplement the company"s present line of air and electric tools for contractors. Named to head the new division are William J. Miller and Elmer R. Stitt, former president and vice-president of the Master Vibrator Co. They have established headquarters at Thor's main offices at Aurora, Ill.

**Red-E-Crete, Inc.:** Completion of a new plant to service lower California has been announced by the manufacturers of ready-mixed cement products and asphalt in sacks. The parent plant is in Glendale, Calif. All mixing, sacking and weighing is done automatically by electronic push-button equipment, employing solenoids and micro-switches. The plant has a capacity of 1,000,000 sacks yearly. Buster B. Burgess is in charge of operations and sales.

**Marco Equipment Co.:** A heavy-duty machinery rental firm, Marco Equipment Co., has been opened at Phoenix, Ariz, by owners of Mardian Construction Co. Arthur R. Schlosser is manager of the new business. He formerly was equipment and supply manager for the construction company.

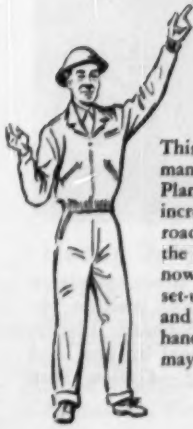
## Associations

**Asphalt Institute:** The national research and development association for the asphalt industry, with headquarters at College Park, Md., will open a new district office at Albuquerque, N.M. The new office will serve the state of New Mexico and parts of west Texas. Hugh A. Wallace, division engineer at Dallas, is in charge. The Institute also announced that a former New Jersey highway department asphalt plant inspector, Harry J. Thompson, has been named assistant to the division engineer of the Atlantic-Gulf Coast division. Hjs office is in New York City. The research staff of the Institute has been expanded with the addition of a former South Dakota highway department bituminous mixture expert, Bernard F. Kallas, Jr. He was named assistant in charge of laboratory activities under research engineer John M. Griffith.

# You Can Bid any Road Job Successfully with this One-Man Operated Plant

With the completely automatic new BUTLER 0-1-0 only one man is needed to batch sand, cement and two sizes of stone at a rate that easily keeps abreast of two 34E dual-drum pavers.

Controls for any specified concrete proportions are pre-set. Until the specifications change, complete batching is achieved at the touch of push buttons . . . Savings in man power, time and costs are correspondingly great.



This development of the BUTLER one-man operated Automatic Roadbuilders Plant is a logical answer to the enormous increase in highway construction. The roadbuilder must consider realistically the sharply cut costs this plant provides; now the owner of a BUTLER Automatic set-up can bid any paving job successfully and make a greater profit. On the other hand a contractor with yesterday's plant may find he can get no work at all.

**Write for the new Bulletin completely describing the new BUTLER 0-1-0. Just a postcard will do — but send it today.**

**BUTLER BIN COMPANY**

949 Blackstone Avenue • Waukesha, Wisconsin

# CONSTRUCTION EQUIPMENT NEWS

## Big Truck For Big Jobs

To dump its 32-yd load, the trailer wheels move forward toward the tractor wheels and the entire trailer raises. A guide stabilizes the body so that there is no excess strain on the twin, three-stage telescopic hoists. Called the 802-B, the truck has a gross combined weight of 165,000 lb. It is powered by 300-hp turbo-charged Cummins NRT-600 diesel.—**Kenworth Motor Truck Corp., Seattle, Wash.**

## When Falls Are Hazards

Tensioned spring that feeds up to 100 ft of line gives protection without confinement. Should man slip, brake stops line.—**Wind-Kor Automatic Safety Device Co., 3960 N. Elston Ave., Chicago, Ill.**

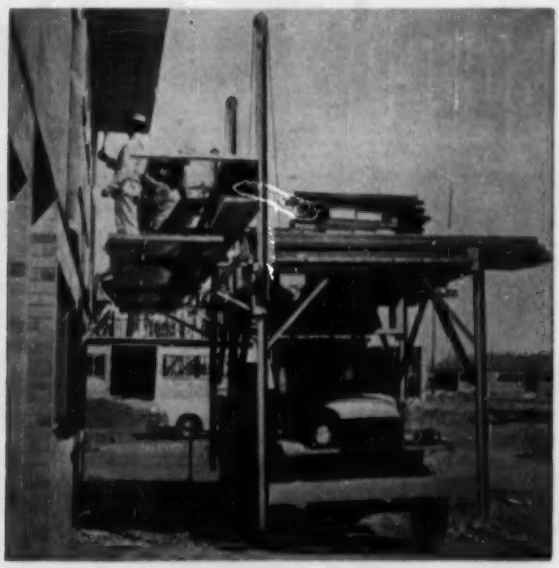
## Big Grader Has Torque Converter

The 40,125-lb Galion T-700 is by far the world's heaviest motor grader. Rig is powered by a 190-hp Cummins diesel. It features Galion's Grado-Matic-Drive, which utilizes a GM-Allison torque-converter and power-shift transmission. Two finger-tip control levers, one for forward-reverse and the other for low, intermediate, and high, give three speeds in both directions. Other standard features include 14-ftx30-in. hydraulically shiftable mold-board; 12-ply, 16.00x24 low pressure tires; four-wheel brakes; and foot decelerator for reducing speed.—**Galion Iron Works & Mfg. Co., Galion, Ohio**

# On-the-Job Previews of Machinery, Tools and Equipment

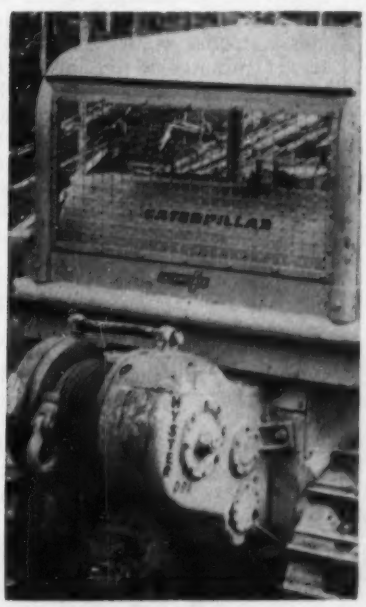
## Drills Under Highways, Sidewalks

Prewitt's horizontal digger drills up to 48 ft with 12-in. augers. The digger is pinned to the ground with spikes to make a solid base while the forced-fed feed screw keeps pressure on the augers. It is driven by a 5½- or 7½-hp Wisconsin gas engine.—**J. R. Prewitt & Sons, Pleasant Hill, Mo.**



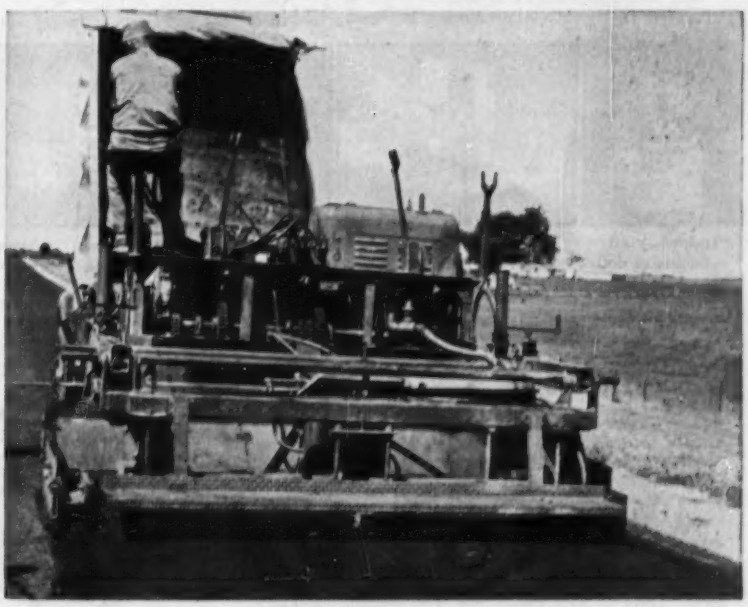
## Push Button Mobility

Push-button controls raise the truck-mounted Power Tower 40 ft or higher. Cables from electric hoist, running on pulley over I-beam supports, have a 2,500-lb capacity. Materials are on rack over the truck, and a power saw is bolted to the scaffold.—**Power Tower Co., 215 W. Galer St., Seattle, Wash.**




## Heavy Duty Winch

Built for Caterpillar's D9 crawler, the D9A winch develops 76,000 lb of line pull, weighs 3,250 lb. It has a constant mesh transmission, and 15-in. brake.—**Hyster Co., 1800 N. Adams St., Peoria, Ill.**



## New Paver Has New Ideas

Pioneer's Vibromatic bituminous paver incorporates new design principles that give high-speed, exceptionally uniform delivery of any kind of asphaltic mix. Key units in the new paver are its radically different screed and compactor. The oscillating screed, consisting of a toothed strike-off bar and a 2-in. heel that acts as a pre-compactor, meters out the required thickness and then fills in

# Here's how Blackhawk design speeds up jacking jobs

**ONE MAN** on a short handle quickly applies vast lifting tonnage. Above — two 50-ton Blackhawk Hydraulic Jacks supply precision raising and lowering to 1/1000 of an inch — promoting efficiency, safety and speed.

**"Lightning Lift"** —Exclusive double pump construction for quick load contact and easy power lifting.

**More Efficient!** One-man operated Blackhawk Hydraulic Jacks are 94% efficient as compared with only 12 to 30% efficiency for mechanical jacks.

**Easily Carried by One Man!** Compact, lightweight Blackhawk jacks are easy to position in tight spots.

**Exclusive design features prevent damage**—eliminate costly delays on the job. Avoid many expensive repairs to jacks.

***More ease, too!*** This combination of big exclusive features is a sure key to less effort plus greater speed and better workmanship on jacking jobs. They are some of the reasons why Blackhawk Hydraulic Jacks are so superior.

You also have extra utility — by attaching a gauge (do it yourself easily) to test, weigh, etc. And Blackhawk Jacks last longer and are so trouble-free because they are fortified with exclusive design features proven by 27 years of field experience. Get Blackhawk Jacks (at new low prices) from leading supply houses.

*Bank on Blackhawk for the* **MOST COMPLETE LINE OF HYDRAULIC JACKS ... 1½ to 100 Tons**

**BLACKHAWK®**

**WORLD'S LARGEST MANUFACTURER OF HYDRAULIC TOOLS**

**BLACKHAWK MFG. CO., J-23125, Milwaukee 46, Wis.**




the voids across the width of the mat by means of oscillation and vibration. A high-speed compactor, heated across its full width, irons out the surface to a uniform density. Tests indicate there is no segregation and no significant variation of specific gravity or density.

During tests, the Vibromatic has laid a smooth, uniform mat 1½ in. thick and 12 ft wide while traveling 66 fpm. In continuous operation, the paver has laid between 250-300 tons per hr while moving at top speed. A 43-hp, 1700-rpm, six-cylinder Continental Red Seal gas engine with an 11-in. Borg and Reck clutch provides seven operating speeds up to 66 fpm and travel speeds as high as 2.64 mph forward and 1.14 mph in reverse.

Mat thickness is controlled by independently operated screws located on each side of the screed assembly that allow adjustment up to 10-in. Crown adjustments from ½-in. negative to 2½-in. positive are made while the machine is operating by adjusting a simple screw at the rear of the paving section.

Simplicity of design and good maneuverability are other important features. At the end of a run, the paving section is hydraulically lifted into traveling position and the machine moves to the next starting point. It takes only a matter of minutes to disconnect the paving section from the tractor because there are no mechanical drives between the tractor and the paving section. Pull a pin on each side of the two arms and disconnect four hoses and the hydraulic cylinders to separate the units.

Unobstructed visibility of all phases of the paving operation are claimed for the Vibromatic. The action of the material screws, the full width of the screed and the hopper, and the pointer on the line being laid are all clearly visible from the operator's seat. Fingertip control of air-actuated hydraulic clutches and hydraulic lifting and lowering of screeds also add to ease of operation.

The standard paver weighs 20,500 lb., is 18 ft long, 10 ft wide, and 7 ft 2 in. over the seat. Extensions are available in 6- and 12-in. increments to lay and compact a mat 14 ft wide. Cut-off attachments in 3-in. increments will reduce paving width down to 8 ft. Big 4½-yd hopper is standard. **—Pioneer Engineering Works, Inc., Minneapolis 13, Minn.**

# MORE PULL WITH LESS FUEL!

***AiResearch Turbochargers provide rapid response to acceleration demands...end objectionable smoking!***

Consider what the application of AiResearch Turbochargers to diesel locomotives will accomplish: A team of these small power packages will provide a greater increase in power at smaller cost in space and weight than any comparable turbocharger or supercharger installation.

In addition, specific fuel consumption on a horsepower per hour basis will be far less. Sea level performance will be restored within operating limits at altitude, response to acceleration demands will be rapid and excessive smoking under operating power eliminated. Also, the noise level will be greatly reduced.

Application in other fields will be equally effective, as has already been demonstrated in the remarkable results achieved by the installation of AiResearch Turbochargers on Caterpillar diesel machinery.

AiResearch is the largest producer of small turbomachinery in the United States, with twenty-five *million* hours of experience. This unmatched experience explains why AiResearch Turbochargers lead in power, economy and dependability.
Your inquiries are invited.

**THE GARRETT CORPORATION**

AiResearch Industrial Division

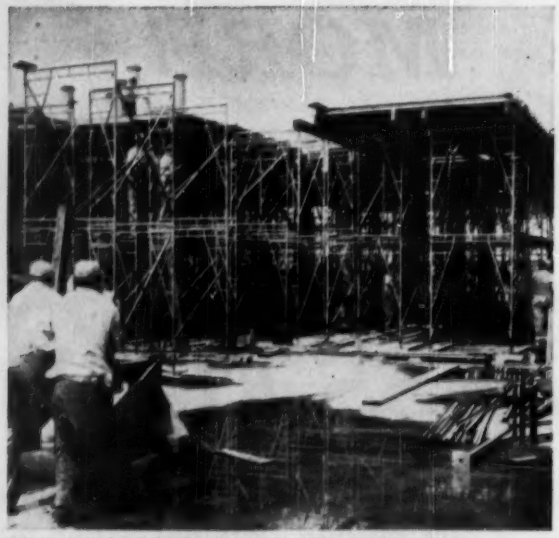
*9225 Aviation Blvd., Los Angeles 45, California*

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

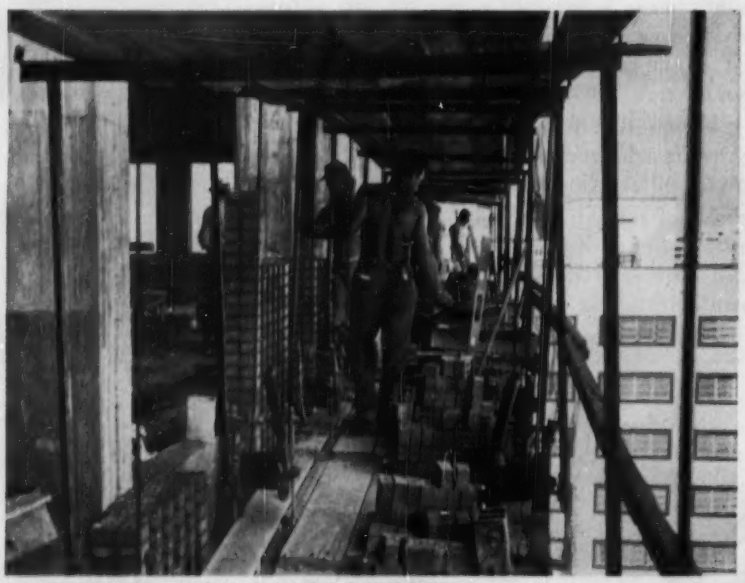
*(Advertisement)*

# *Scaffolding Methods . . .* by Patent Scaffolding Co.

**END OF THE OLD WORLD**—To raze the 13-story Pulitzer building, former home of the old New York World newspaper, more than 3,500 6'6"-high "Trouble Saver"® Sectional Scaffolding frames, spaced 6' apart, were used by Lehigh Salvage Corp. and J. Klotz, Inc. wrecking contractors. Double 8" I-beams, projecting through wall, is the method used to support 89' of the scaffolding adjacent to the busy approach to Brooklyn Bridge.



**SLIDING SHORING SYSTEM**—Disassembling and reassembling shoring is eliminated by the Wigton-Abbott Corp., Plainfield, N. J., by sliding entire units of the "Trouble Saver" Sectional Shoring on wood sills with a hand winch. Eleven of these shoring units, each covering 720 sq. ft., were slid three times by this method for succeeding concrete pours during construction of the 189' x 231' Monsanto Chemical Co., warehouse, Kearney, N. J.



**SUSPENDED FOR BRICK WORK**—A 5'-wide working platform is provided for brick masons and materials by "Gold Medal"® Scaffolding Machines while laying up brick veneer on the new 13-story Court House in Tulsa, Okla. Supported by steel I-beams secured to the roof, these suspended machines keep masons at most efficient working level as work advances. Equipped with overhead attachments for planking, the scaffolds also protect workers from falling objects. This scaffolding method was employed by the Manhatten Construction Co., Muskogee, Okla.

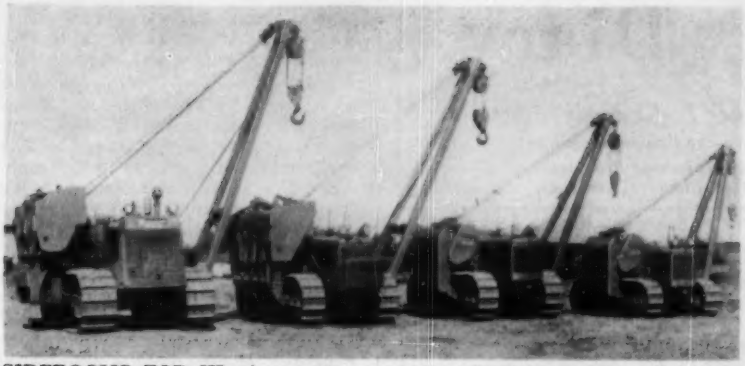
**FAST LOCK-UP**—"Trouble Saver" Scaffolding frames are available for sale or for rental with these fast-acting SlideLoks for joining braces to frames. Wing nuts are eliminated. SlideLoks cut erection and dismantling time and increase safety.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.

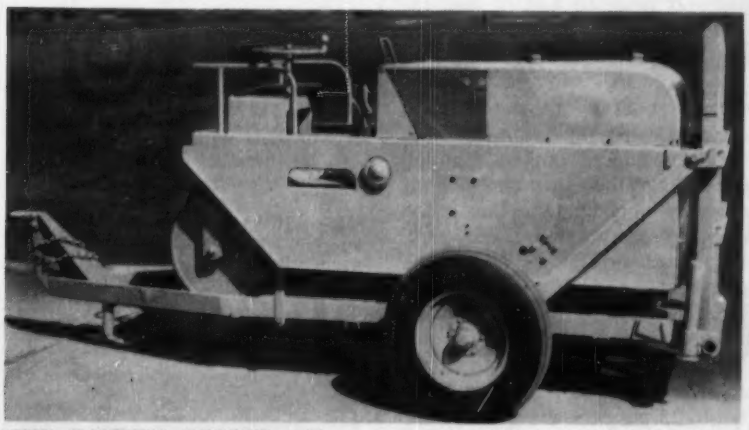
*FOR GREATER SAFETY...EFFICIENCY...ECONOMY*

**THE PATENT SCAFFOLDING CO., Inc.**

**38-21 12th Street Dept. CM&E Long Island City 1, N. Y.**
***West Coast:* 6931 Stanford Ave., Los Angeles 1, Calif.**
***Branches in all principal cities***
**In Canada: 355 Dufferin St., Toronto**



**SIDEBOOMS FOR IH**—A complete new line of Superior sidebooms will fit any International tractor, from the TD-24 to the TD-9. The new booms feature extendable bottom-hinged counterweights that are operated and powered by a combination pump and valve tank unit. Lifting capacities have been raised to 110,000 lb for the model PBL-241Bh at a 4-ft radius. To aid operator, control levers have been changed from vertical to horizontal positions. **—Superior Equipment Co, Bucyrus, Ohio.**



**NEW TANDEM ROLLER** — Even distribution of both steel and water ballasting provides a compaction range of from 1½ to 2½ tons for the new Model 55 tandem roller. The steel ballasting is removable in 70-lb sections. On the driver's side, it can roll within 2 in. of obstructions, and its 8-in. ground clearance provides flush rolling right up to curbing. A ramp-type transportation trailer is available that permits one man to load the roller.**—Standard Steel Works, North Kansas City, Mo.**

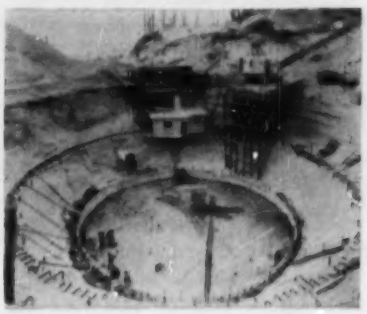
**A-C MOTOR GRADER**—The model Forty-Five motor grader is a new heavy-duty unit powered by a new Allis-Chalmers diesel, the six-cylinder, four-cycle model ADS-516, with a maximum brake hp rating of 120 at 1600 rpm. The new grader weighs 23,800 lb, with 17,375 lb on the tandem-drive rear wheels and 6,425 lb on the front wheels. Blade pressure is 10,950 lb. The new grader features a fingertip control box with toggle-


HOW TO HANDLE
WET JOBS

PUMPING
STATION

City of Grand Rapids, Michigan

*Contr.: Owen-Ames-Kimball*



DRIED FAST; NO SHEETING
SILT PROBLEM OVERCOME

IN ONE MONTH from installation, the concrete base slab (4 ft thick, 71 ft diameter) was completed—deep down at 35 ft below water level. Half month more finished monolithic circular wall, 40 ft high.

Such were the speeds and savings made possible by Griffin Wellpoint equipment, plus Griffin's long-acquired "know how," which assured correct wellpoint depths, spacings and jetting methods, on this tough-to-handle job.

• Despite 4 ft layer of fine sand and silt, pre-drainage was so thorough that bulldozer could work "on bottom" feeding to crane on trestle. Excavation was open cut, with one-on-one slope. Any wonder this contractor (who had previously tried Griffin "quick-dry" service) came back for a "second helping!"

GRIFFIN
WELLPOINT CORP.
881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.
In Canada: Construction Equipment Co., Ltd.
Toronto Montreal Halifax

# Darex Diary

*No. 7 of a series*

*by Henry L. Kennedy*

*Member, American Concrete Institute*

*Manager, Construction Products*
*Dewey & Almy Chemical Company*

***Curing Air Entrained Concrete**
***Organic Air in Concrete**

AIR ENTRAINMENT in concrete, as is universally known, provides improved durability and resistance to freezing and thawing. However, air entrainment itself is not an automatic solution to all concrete problems. For example, the temperature at which the concrete is placed affects the final result. Even more important is the interval between finishing and the time the concrete is salted for de-icing purposes.

Concrete must be allowed to mature. Or, it may be said that the concrete slab must cure and dry out to the extent that excess water is no longer available as freezable water. In cases in which air entrained concrete showed a decided lack of durability, freezing weather had set in within six weeks of the time the concrete was finished, and salts had been applied shortly afterwards. When concrete is placed after October, a good rule of thumb is to keep salts off your highway for the first year.

To simulate field exposure conditions, laboratory freezing and thawing tests were conducted with a 10% $CaCl_2$ solution in the Dewey and Almy Cement and Concrete Research Laboratories at Cambridge. A 24-hour cycle of freezing and thawing is used in the Dewey and Almy Laboratories, and measurements were taken at 20, 40, and 60 cycles.

A number of air entrained concrete specimens were cured moist for 28 days and immediately subjected to freezing and thawing. Companion specimens were cured moist for 14 days, and then dried out for 14 days before being subjected to the freezing and thawing cycles. At 40 cycles, the moist-cured showed 17% loss of weight, and the dry-cured only 2% loss. At 60 cycles, the moist-cured showed 31% loss, while the dry-cured showed but 3% loss.

* * * * * * * *

One of our field engineers just returned from a trip through the Mid-west reported that he had encountered another case of "organic air". By definition, organic air is a system of air voids in concrete brought about by the presence of certain organic substances in sand. These substances possess foaming properties of their own and will entrain air in concrete in much the same way as any air entraining agent, except that organic air cannot be controlled.

Organic air is not necessarily desirable air for several reasons. First, organic air has been found by one investigator to vary from 5 per cent to 23 per cent, even though the sand was reclaimed from the same deposit. Second, the air system so entrained is generally unstable and will break down during handling of the concrete. Third, poor spacing and size of the air bubbles—even though the optimum volume of air is present—contributes little toward improving durability.

A peculiar characteristic of these organic products is their capacity to remain undiscovered when the sand is evaluated by standard test procedures. Such sands—if otherwise suitable—normally will not reveal their organic constituents in the sodium hydroxide color test. In most cases, the use of minute quantities of tributol phosphate or isopropyl alcohol as a defoaming agent will eliminate organic air.

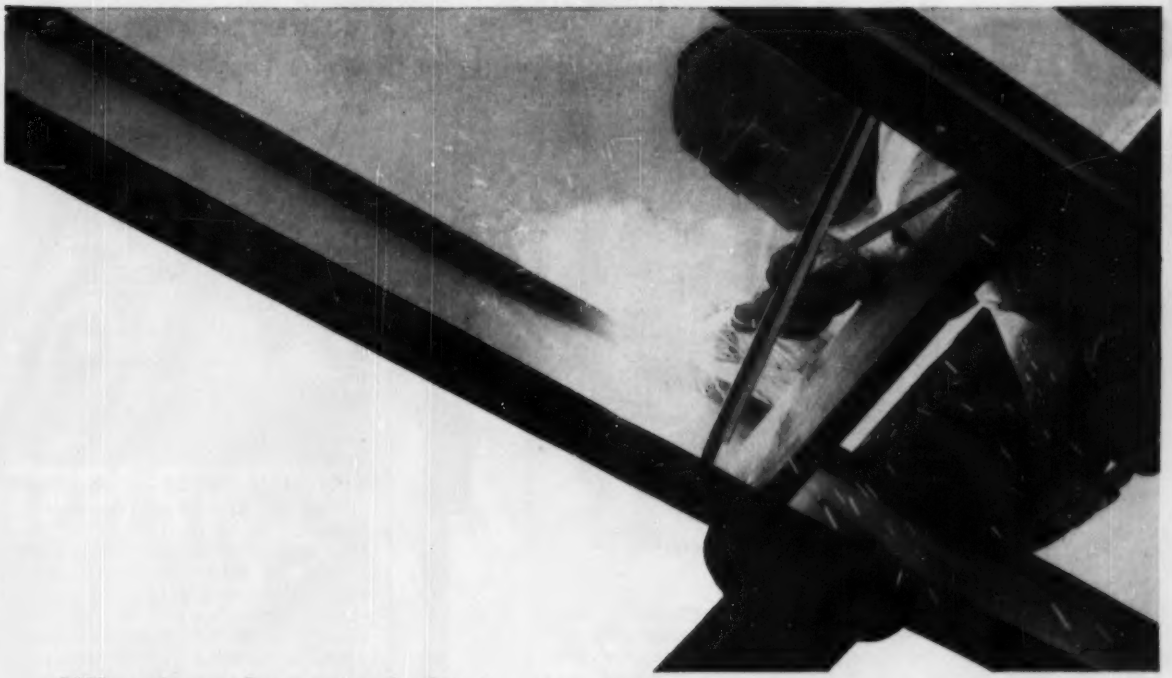

**DEWEY and ALMY CHEMICAL COMPANY**
DIVISION OF W. R. GRACE & CO., Cambridge 40, Mass.
Offices or Subsidiaries in principal U. S. cities
and in Buenos Aires, Copenhagen, London, Melbourne, Milan, Montevideo, Montreal, Naples, Paris, São Paulo, Wellington.




type linkage that gives increased leverage for smooth moldboard, wheel lean and scarifier operation. The new Allis-Chalmers diesel, with a4 7/16-in. bore, 5 9/16-in. stroke, and 516-cu in. piston displacement, provides forward speeds up to 20.6 mph and reverse speeds up to 7 mph. According to the manufacturer, the grader can be throtted down, under governor control, to half these rated speeds without losing rim pull. Other features include combination mechanical and hydraulic power steering, self-energizing brakes aided by a two-stage master cylinder, conveniently located engine and transmission controls, new double-disk master clutch with ceramic lining, and an accelerator-decelerator pedal that permits engine speeds to be increased or decreased without changing hand throttle settings.—**Allis-Chalmers Manufacturing Co., Tractor Group, Milwaukee, Wis.**

**QUIET PUMP**—A new self-priming, centrifugal pump is said to work with little noise at a slow speed and yet deliver as much as 9,000 gal of water an hour. The new Model 36S2 is equipped with a carburetor that can be throttled down to 1,200 rpm without losing its efficiency. The pump has a guaranteed 28-ft. suction lift and automatic priming at 5-ft. suction lift taking only 9 sec. The 87-lb pump is powered by an air-cooled, two-cycle Homelite gas engine. — **Homelite, Riverdale Ave., Portchester, N. Y.**

**HANDLES EXPLOSIVES** — Lightness, strength and flexibility have been combined in a sectional explosives tamping pole recently placed on the market. Sections are easily joined to form a pole adaptable to any depth, thus eliminating the need for excessively long and hard-to-handle poles. Pole sections, with a diameter of 1½-in., are made of Douglas fir. They are connected by non-



# Why be almost right...

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For better welding performance let Westinghouse welding engineers help you select the *right* rod for your particular application. Whether it's mild steel, low alloy steel, stainless steel, cast iron or hard surfacing, the broad range of Westinghouse types and sizes assures you of an electrode best for you—best for top welding results at lower cost in your particular application.

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- ☐ Mild Steel Electrodes (B-6078)
- ☐ New RA Welder (B-6129)
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**Elis** Shores and Shoreheads Speed Up Beam Construction!

*Photo shows a row of Elis Shores and Shoreheads, with one old-type shorehead (at left) for contrast.*

Part of a gigantic construction job in which Elis Shoring Methods were used throughout, this illustrates the economical application of these methods to beam construction. An Elis Shorehead can be used thousands of times with no waste of material—compared with old methods wasting about 6 lin. ft. of 1 x 6, 3 lin. ft. of 4 x 4, 6 saw cuts, and 20-30 nails, and resulting in a shorehead usable only 10-15 times. It takes only one-half minute to attach or detach a "long-life" Elis Shorehead.

MFD. BY ELIS EQUIPMENT CO., INC., 211 N. W. 4h ST., OKLAHOMA CITY, OKLA.

All Madesco Blocks Are Engineered to Serve Your Special Service Needs

FOR SAFE AND SPEEDY HOISTING

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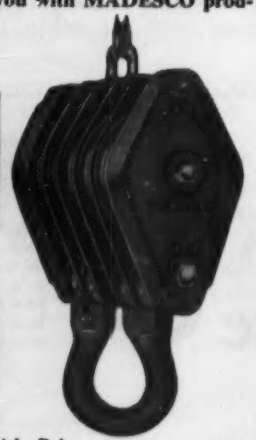
Our special service departments will help you with their recommendations. Write for our catalog or consult your equipment dealer who can supply you with MADESCO products.

MADESCO BLOCKS



MADESCO TACKLE BLOCK CO., EASTON, PA.
A Subsidiary of Nazareth Cement Company

HAE-MB-104,55




sparking magnesium-bronze joints. The poles sell for $6.50 per 10-ft section.—**Ideal Explosives Supply Co., 95 Craggy Ave., Asheville, N. C.**

**NEW BLUE BRUTE**—Streamlined styling and several new engineering changes are incorporated in the new Blue Brute 600 portable rotary compressor. A new easy-acting clutch allows the operator to warm up the engine before cutting in the compressor, a feature that cuts wear, provides quicker starts in cold weather and simplifies engine maintenance. The fully self-draining compressor eliminates settling of oil and moisture in any low areas of the cylinders, inter-stage chamber or discharge point. Additional features include a two-stage oil separator, separate oil reservoir and air tanks, and a shorter wheel base for easier handling.—**Worthington Corp., Harrison, N. J.**

**ALLISON TORQUE LUBRICANT**—D-A torque fluid meets and exceeds Allison's specifications for hydraulic transmission fluid, Type C. The new fluid is said to offer proper affinity to prevent seal deterioration, exceptional stability, and resistance to oxidation. The oil will not thicken or develop sludge when used for the recommended amount of time. —**D-A Lubricant Co., 1331 W. 29th St., Indianapolis, Ind.**

**PRESSURE CAULKING**—The Calbar 55 air pressure caulking gun does the job in half the time required with hand-operated guns, according to the manufacturers. The gentlest pressure on the trigger releases the caulking compound; to stop the flow, release the trigger and the guns stop immediately because an automatic valve lets the excess air escape. Three nozzles, with individual end shapes are supplied

# USS HIGH STRENGTH STEELS...

Filling in ditches, digging new watercourses and cutting city streets—just another day's work for this Cat Crawler Tractor. This particular piece of equipment, owned by the City of Golden, Colorado, consists of a Caterpillar D4 Tractor equipped with 45 Bulldozer.

## help relocate COLORADO WATERWAY!

The City of Golden, Colorado, is expanding. Hitherto undeveloped land is now being surveyed for city blocks and house lots. But before this could be done, much preliminary work had to be completed—like the job illustrated here, where a watercourse had to make way for a city street.

This big CAT track-type Tractor and Bulldozer, shown cutting a new stream bed, is typical of the high-powered, hard-working earthmovers used on this project. To handle these large tonnages of earth and fill without undue delay, the equipment had to be strong and sturdy; and at the same time, be able to resist the shock and withstand the abusive effects of rough, rocky terrain. To give their equipment the ability to stand up in service like this, Caterpillar Tractor Co., Peoria, Illinois, utilized the superior strength and long life of USS MAN-TEN HIGH STRENGTH STEEL. This steel adds extra life to vital parts like moldboard, moldboard end plates, channels and stiffening members.

United States Steel produces three different grades of USS High Strength Steel—COR-TEN, MAN-TEN and TRI-TEN—each having distinctive characteristics and each recommended for certain end uses where its specific properties will assure longer service and greater over-all economy. All three grades have a yield point 50% higher than carbon steel and all offer properties which allow greater strength and toughness to be built into the vital parts of equipment that might be prone to failure.

In the construction field these steels can be used to replace carbon steel in the important parts of shovels, dozers, scrapers, trucks and other such equipment to increase service life without increasing deadweight. And if the use of thinner sections is possible, they can (1) reduce equipment weight without reducing its strength, or (2) increase the size and capacity without increasing the total weight or the power needed to move it.

### NOW AVAILABLE

Our new "Design Manual for High Strength Steels" is ready for distribution. This excellent book contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and efficiency by the sound use of high strength steels.

For your free copy, write on your company letterhead giving your title or department to United States Steel Corporation, Room 4992, 525 William Penn Place, Pittsburgh 30, Pa.

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NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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## USS HIGH STRENGTH STEELS

USS

UNITED STATES STEEL

# Drivers last longer...

## when heavy-duty trucks use J-M Brake Blocks

Experienced operators know that when their vehicles are equipped with Johns-Manville Brake Blocks they can handle crushing loads without personal danger.

That's because these rugged, durable J-M Brake Blocks are engineered for the job . . . and designed for dependable performance plus maximum service life on trucks, shovels and heavy machinery.

They are "standard parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are now available in Johns-Manville Assembled Sets that put new safety into your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 60, New York 16, N. Y.

Johns-Manville Industrial Friction Sets are available in a wide range of molded or woven, rigid or flexible asbestos materials.

JOHNS-MANVILLE JM PRODUCTS

**Johns-Manville**

**INDUSTRIAL FRICTION MATERIALS**



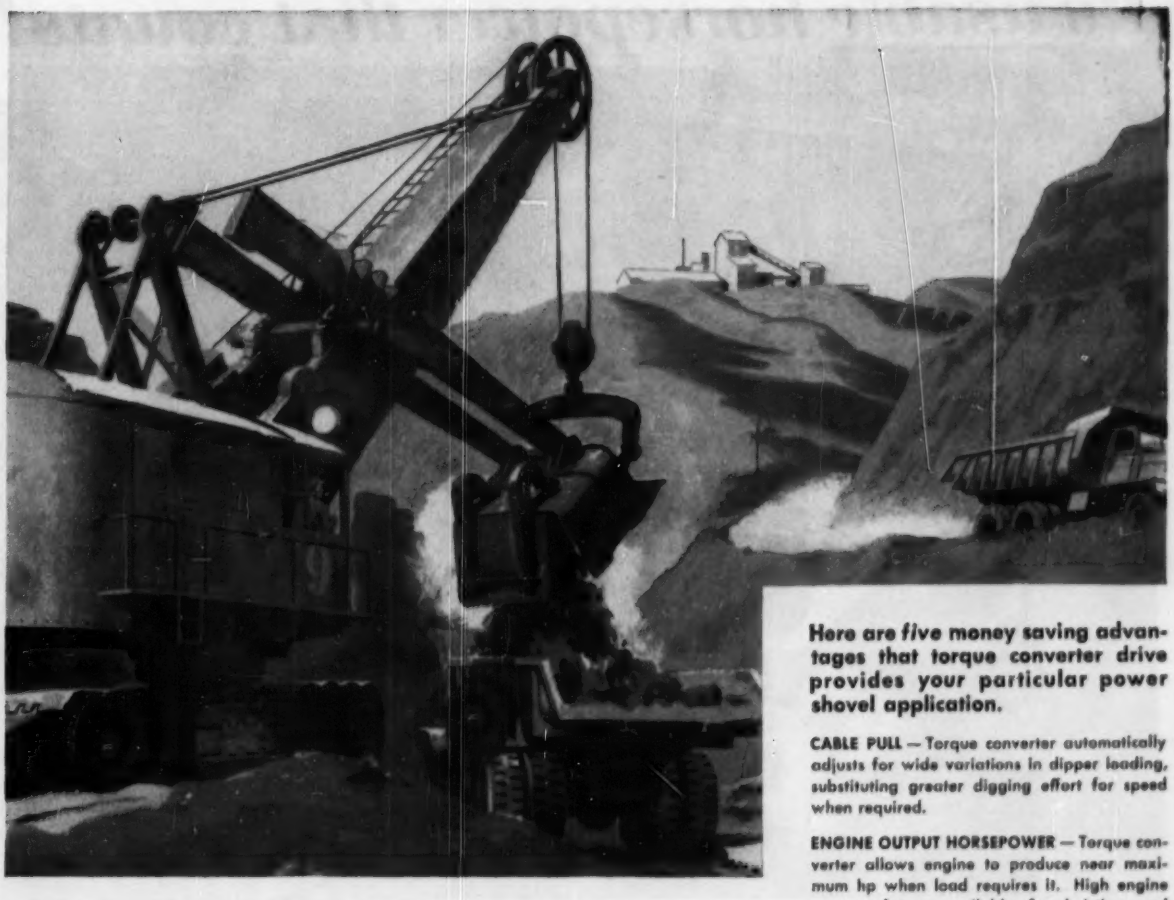



with each gun. When powered by a gasoline or electric compressor, the gun takes from 40 to 100 lb of pressure. It is said to force caulk far deeper into crevices than an ordinary gun.—**Calbar Paint & Varnish Co., 2612 N. Martha St., Philadelphia 25, Pa.**

**NEW SHOP PRESS**—New 30-ton hydraulic shop press features horizontal bed channels that extend beyond the upright channels to form an open throat work area that increases its versatility. The upright channels also have window openings to accommodate bars and long shafts for straightening or service work. As with all OTC hydraulic equipment, the 30-ton Power-Twin ram and the two-speed pump are readily detachable for use with other OTC pullers and accessories on other service jobs in the shop or the field. The new press is 72 in. high, 55 in. wide and weighs 820 lb with the ram and pump.—**Owatonna Tool Co., 380 N. Cedar St., Owatonna, Minn.**

**ALUMINUM WELDING CABLE**—Aluminum welding cable, weighing only one-half as much as conventional copper welding cable, is put on the American market for the first time, although Germany has found aluminum cable practical for some years. Besides its lighter weight, the manufacturers claim it is more flexible, costs about 20% less than copper cable, cools twice as fast as copper. On the negative side, size for size, aluminum will carry only 61% as much current as copper. The aluminum cable called Tweco-Lite, is available in grade SR with a synthetic rubber jacket for normal use and in grade N-60 with a neoprene jacket reinforced with rayon braid for rougher usage.—**Tweco Products Co., P. O. Box 666, Wichita, Kan.**

*(Continued on page 165)*



# $750 SAVED IN ONE SEASON

## using Torque converter on power shovel

A prominent contractor recently reported that he saved $750 in one season using a Twin Disc *Three-Stage* Torque Converter on one of his power shovels.

This total was comprised of savings on three different phases of the shovel's application. (1) Cable—on two shovels with direct drive, cables were replaced *seven times* on one and *eight times* on the other. With torque converter drive, however, the cable was replaced *only three times*. Resultant saving: $350. (2) Maintenance costs — a saving of 12½ cents per hour, or a season total of $250 on the shovel with the Twin Disc Converter. (3) Fuel consumption — the torque converter unit used ½ gallon less fuel per hour, saving $140 in the 2,000 hour season.

*You* can realize a *similar* saving from *your* power shovels. *Specify* Twin Disc Torque Converters for your new units or *install* them in your existing equipment. For full details see your equipment or engine distributor. Write for bulletin 135-D.

*All facts in the above story are contained in an actual case history. We have not identified the operation because publishing the owner's name would reveal confidential information.*

**Here are *five* money saving advantages that torque converter drive provides your particular power shovel application.**

**CABLE PULL** — Torque converter automatically adjusts for wide variations in dipper loading, substituting greater digging effort for speed when required.

**ENGINE OUTPUT HORSEPOWER** — Torque converter allows engine to produce near maximum hp when load requires it. High engine power always available for hoisting and crowding.

**ENGINE SPEED** — Torque converter provides high engine speed throughout its working range, and higher hp output is available for heavy digging and hoisting loads. Converter equipped engine can't lug. Heavy overloads will not kill the engine.

**LOWER MAINTENANCE COST**—Torque converter reduces peak loads throughout shovel drive train. Cushioning shocks increases wear life for most parts subject to fatigue failure.

**LONGER CABLE LIFE** — In proved installations, even frayed cables with short life expectancy have been known to last a year or more where a torque converter has provided smooth, sustained output power.

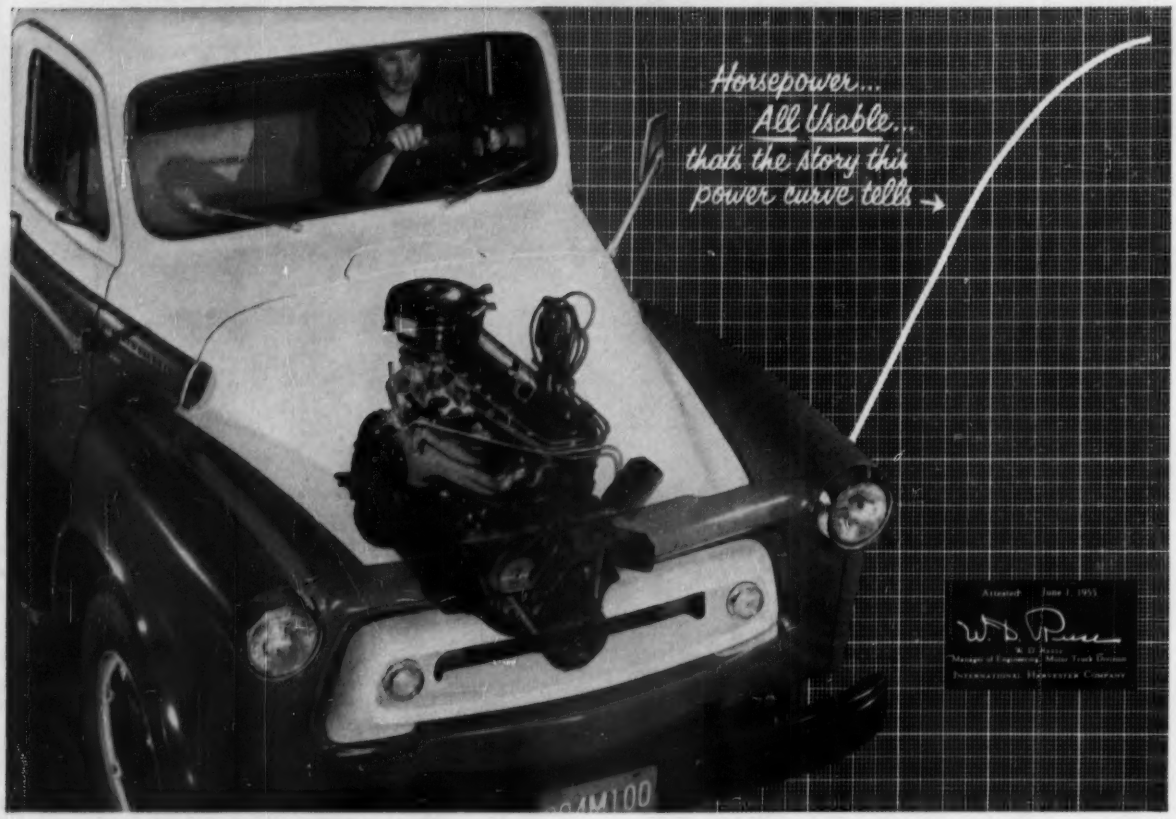
TWIN DISC

**TWIN DISC**
**Torque Converters**

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES OR SALES ENGINEERING OFFICES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

# *It's usable horsepower that counts!*




**Many** passenger car type truck engines have to rev up to high speeds to pull their loads. They strain at the job—cost big money in wear and repair. INTERNATIONAL all-truck engines turn at relatively low rpm—deliver high usable horsepower at normal road speeds, for peak performance, long life, BIG money savings.

## *Internationals give you power without strain at safe, economical rpm to save you the BIG money!*

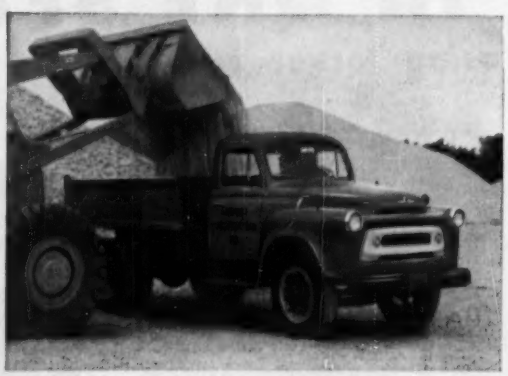
**Rated horsepower figures** don't tell the whole story of truck performance.

Wise truck buyers want to know *more* than rated horsepower. They want to know what actual *usable* horsepower they are going to get to pull capacity loads at normal, legal speeds—without undue engine strain.

*Usable* horsepower—that's the point to keep in mind when buying trucks.

INTERNATIONAL engines deliver high usable horsepower at economical, wear-reducing speeds. Because they are built for use in *trucks*, with no compromise with passenger car design.

You get the usable power you need, plus longest truck life, every driver comfort and convenience. See your INTERNATIONAL Dealer or Branch for trucks exactly right for your job—all-truck built to save you the BIG money.



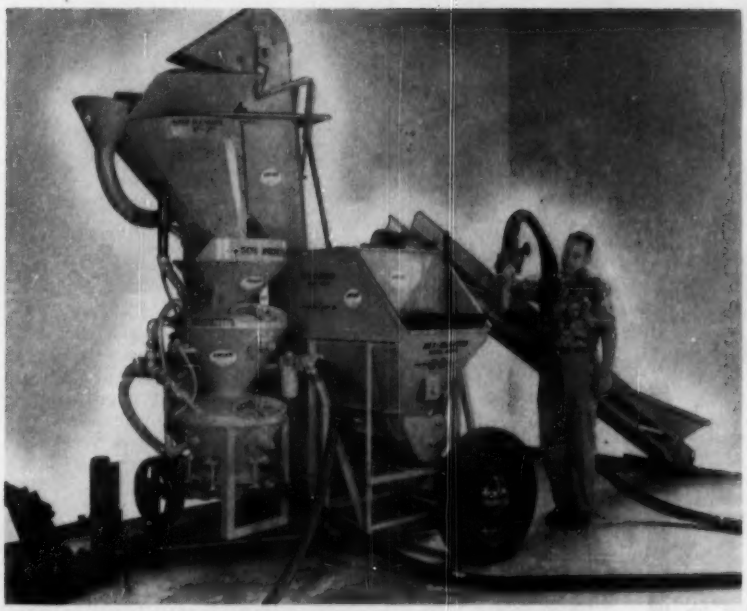
**In the world's most complete truck line,** there are trucks for every job. More than 200 basic models from 4,200 to 90,000 lbs. GVW—conventional and COE, 4-wheel, 6-wheel, four-wheel-drive—in thousands of variations for exact job specialization.

**INTERNATIONAL HARVESTER COMPANY · CHICAGO**

**INTERNATIONAL® TRUCKS**

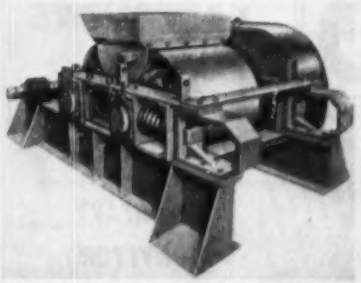
***All-Truck Built to save you the BIG money!***

Motor Trucks • Crawler Tractors • Industrial Power
® McCormick® Farm Equipment and Farmall® Tractors



**CONCRETE GUNNING RIG** — An automatic sand loader and a new-type gun have increased the versatility of Air Placement Equipment Co.'s portable concrete gunning rig. The rig consists of a Nucretor concrete gun, an automatic proportioning, dry mixing and elevating machine, and the sand loader. The sand loader operates from a power take-off from the drive mechanism in the mix elevator. The new gun has an increased capacity of from 2 to 8 yd per hr. The rig is designed so that the entire unit may be hitched either to an air compressor or to a trailer hitch of a truck that is equipped with a compressor.—**Air Placement Equipment Co., 1009 W. 24th St., Kansas City, Mo.**

**SKYHOOK** — The Magic-Pole A-frame supports 4,000 lb, and has a working height of 10 ft., yet weighs only 43 lb, complete with guy line. Telescopic legs, which adjust in 6-in. increments, permit good footing on sloping ground without having to dig in the uphill leg. To store the A-frame, both legs fold together and the telescope to a length of 6½-ft. A screw-in type spike at the base prevents slipping. Guy line can be adjusted so loads may be shifted as much as 3 ft.——**B. E. Wallace Products Co, Exton 20, Pa.**



**TWIN ROLL CRUSHER** — By increasing the width of its 30x24-in. twin roll crusher by 6 in., the new model is said to increase production by 33 1/3% without a corresponding hike in the purchase price. Changing the roll setting to vary the size of the crushed product will also be simpler because of a new hydraulic jack and shim adjustment mechanism. Under test conditions, the 30x24 model has crushed 254 tons of 2¼-in. aggregate an hour, based on material weighing 2,700 lb per yd. Maximum feed size is 4½x4½ in. when using low corrugated rolls. The 11,200-lb crusher is 8 ft, 6 in. long, 6 ft, 10 in. wide and 53½ in. high. Power requirements are in the 85-105-hp range.—**Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.**

*(Continued on next page)*

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+Success
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with Gates

Gates Form Ties were the practical choice for the York Street School under construction in Thornton, Colorado. For all projects, large or small, Gates Form Ties excel—by increasing speed of construction—giving maximum efficiency—
and lowering overall costs!

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Alfred W. Grant
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HOBBS HOUR METERS tell you at a glance when protective maintenance is due — the essential services that lengthen the life of your equipment and reduce repairs.

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The HOBBS HOUR METER is an electric timing instrument that shows HOURS and MINUTES of engine operation — important accuracy that no revolution counter can provide. It records running time on all types of powered equipment — stationary or mobile . . . gasoline or Diesel.

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Installed as original equipment or recommended as an approved accessory by leading construction equipment manufacturers. Ruggedly built . . . easy to install. See your factory branch, representative or distributor . . . or WRITE:

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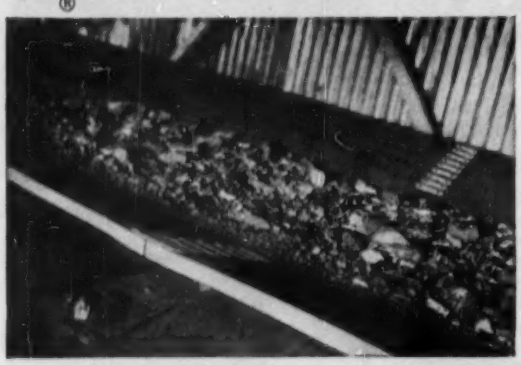
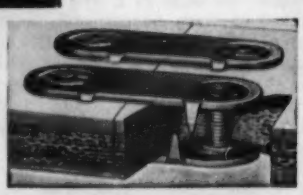
**FLEXCO**®

**BELT FASTENERS and RIP PLATES**



***FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH***

- ★ FLEXCO Fasteners make tight butt joints of great strength and durability.
- ★ Trough naturally, operate smoothly through take-up pulleys.
- ★ Distribute pull or tension uniformly.
- ★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
- ★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

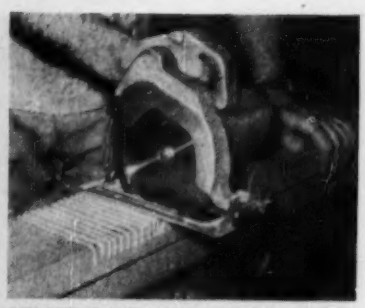


*Compression Grip distributes strain over whole plate area*

*Order From Your Supply House. Ask for Bulletin F-100*

**FLEXIBLE STEEL LACING CO.,** 4699 Lexington St., Chicago 44, Ill.



**CIRCULAR POWER SAW**—A 7-lb, 6½-in. circular power saw that cuts 2 1/16 in. deep and can bevel cut 2x4's at 45 deg, costs only $29.95. Its light weight and good balance permit prolonged one-handed operation for cross, rip and bevel cutting, making preparatory depth cuts for grooving, or cutting asbestos siding, masonite, or sheet metal. It operates on 115 v, ac-dc, 25 to 60 cycles, and is equipped with a telescoping blade guard.—**Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill.**

**BONDING LIQUID**—A new liquid bonding material with a high sheer strength of 2,500 lb to the inch bonds new concrete to old and plaster to green cement without waiting for complete curing of the cement. Applied with brush or spray, Clinch-T is said to take the place of metal lath or ties when applying plaster to concrete walls. Clinch-T is non-toxic, resists most acids and is unaffected by the alkalinity of gypsum, lime-putty, plaster or Portland cement. One gallon, which will cover 350 sq ft. costs $10.—**Dasco Chemical Co., Inc., 1602 Thames St., Baltimore 31, Md.**

**PORTABLE HEAT WAGON**—The Lennox heat wagon has the same kind of heating unit that is found in the line of oil furnaces. Consequently, it can be serviced by any heating dealer. The heater has a 19-gal., self-contained oil supply that will produce heat for 12 continuous hours. Combustion products are exhausted through a pipe at the top of the heater directly into the air or through an exhaust pipe that can be put through a window or a door. It is light enough to be carried upstairs by two men and compact enough to be rolled through a 30-

*(Continued on page 169)*

# Wolverine Contractors know how to get more work out of equipment—use STANOLUBE HD-M Motor Oil

Norris Host (right), President of Wolverine Contractors, Inc., and Robert Larsen, Standard Oil automotive lubrication specialist, talk lubrication on job site. Customers of Bob's like to talk lubrication with him. They know it can pay off for them in better, lower cost operation of equipment. Bob's seven years' service with Standard Oil gives him a solid background of experience for this sort of work.

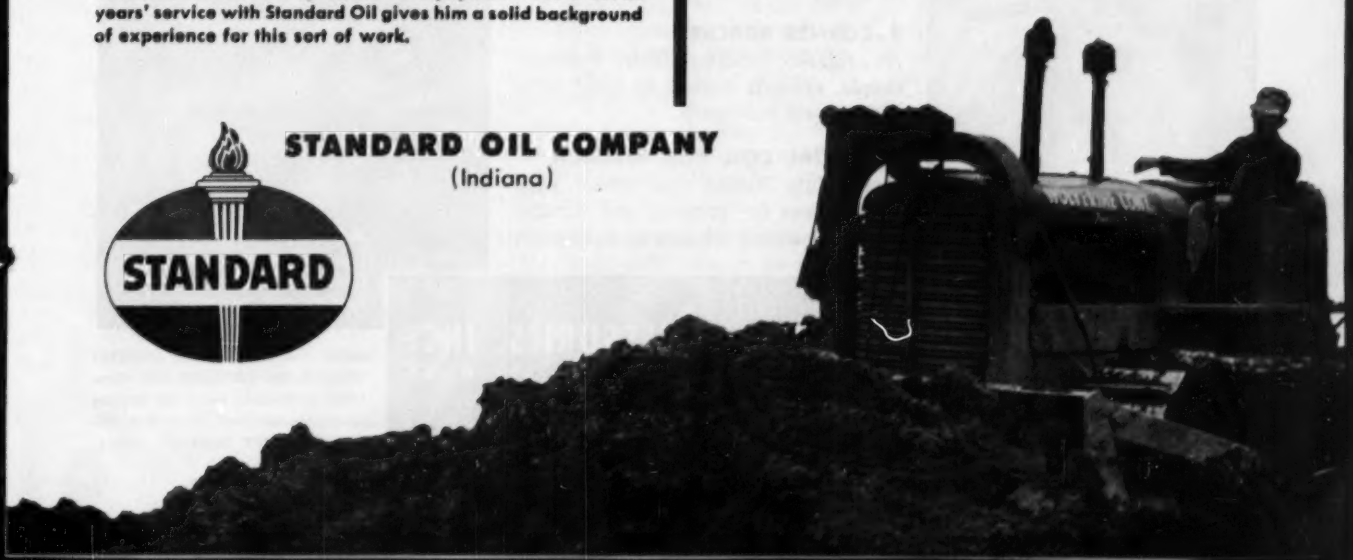
Wolverine Contractors, Inc., Detroit, know that good maintenance begins with good motor oil. They have used STANOLUBE HD-M Motor Oil for many years in both gasoline and diesel equipment. On overhauls, engines come down clean and free of sludge. These are the reasons STANOLUBE HD-M delivers this clean, sludge-free performance:

| | |
|---|---|
| 1 | STANOLUBE HD-M Motor Oil is refined from high quality base stock. |
| 2 | Additives exclusive with STANOLUBE HD-M retard oxidation of the oil, reduce formation of piston and ring belt deposits. |
| 3 | These additives in STANOLUBE HD-M prevent fuel from forming varnish and sludge. |

STANOLUBE HD-M makes the maintenance job easier for maintenance men by: extending periods between overhaul; making the overhaul job easier when it is done; reducing wear and eliminating corrosion of bearing metals. STANOLUBE HD-M Motor Oil makes the construction job more profitable for the contractor by helping him get more operating hours out of equipment.

Get the facts about STANOLUBE HD-M Motor Oil. Get in touch with your Standard Oil automotive engineer. In the Midwest call your nearby Standard Oil office. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Dozer helps with grading on Wolverine Contractor project. As with all equipment Wolverine operates, this dozer gets Standard Oil lubrication exclusively.



**STANDARD OIL COMPANY**
(Indiana)

STANDARD

# SUPERIOR CONTINUOUS THREADED COIL RODS . . .

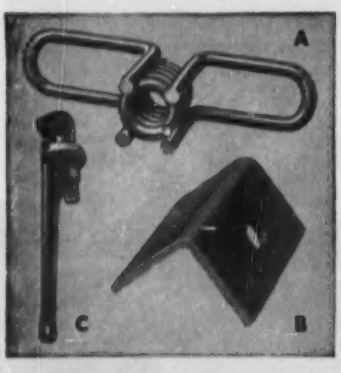
## . . . MAKES DIFFICULT TYING JOBS *Easy* . . . .

Superior Continuous Threaded Coil Rods, with or without Coil Wing Nuts and Corner Brackets, are a valuable supplement to Superior Coil Ties and standard working parts when job conditions are unusual or difficult.

In three typical applications, shown at the right, these Continuous Threaded Rods are used; (1) to tie form corners; (2) as an anchor rod tie down and as coil bolts; and (3) as a coupling for two coil ties providing an adjustable form tie.

Available in ½", ¾", and 1" diameters and in any length up to 10 ft., Superior Continuous Threaded Coil Rods in quantities can be cut to length on the job with a heavy-duty hand Coil Rod Cutter.

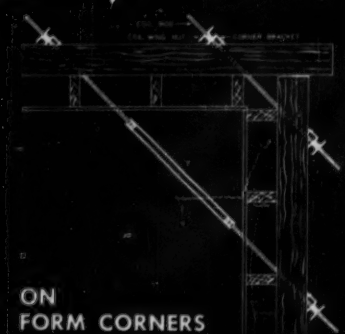
Superior Continuous Threaded Coil Rods are the answer to unusual or difficult tying problems. When you use Superior you are assured of the *best* in design, material, and workmanship.



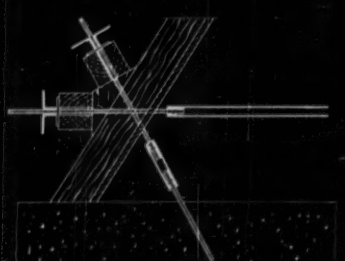

**A-COIL WING NUTS**
Coarse helix coils form the threads. Easily applied and removed from rod. Develops maximum capacity of rods.

**B-CORNER BRACKET**
An *exclusive* Superior feature. Provides simple, efficient method of tying form corners and bulkheads.

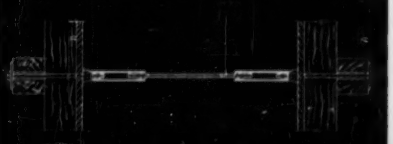
**C-SPECIAL COIL ROD WRENCH**
Heavy-duty Stillson type wrench with special jaws for gripping and turning Coil Rods with least damage to threads.



ON FORM CORNERS



FOR ANCHORAGE



AS AN INTERNAL TIE
Two Coil Ties and a length of Coil Rod make an adjustable form tie and spreader.

**SUPERIOR CONCRETE ACCESSORIES, INC.**
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**NOW AVAILABLE . . . LATEST EDITION OF CATALOG 500. Contains a valuable table for spacing studs, wales, and form ties. REQUEST A COPY TODAY.**

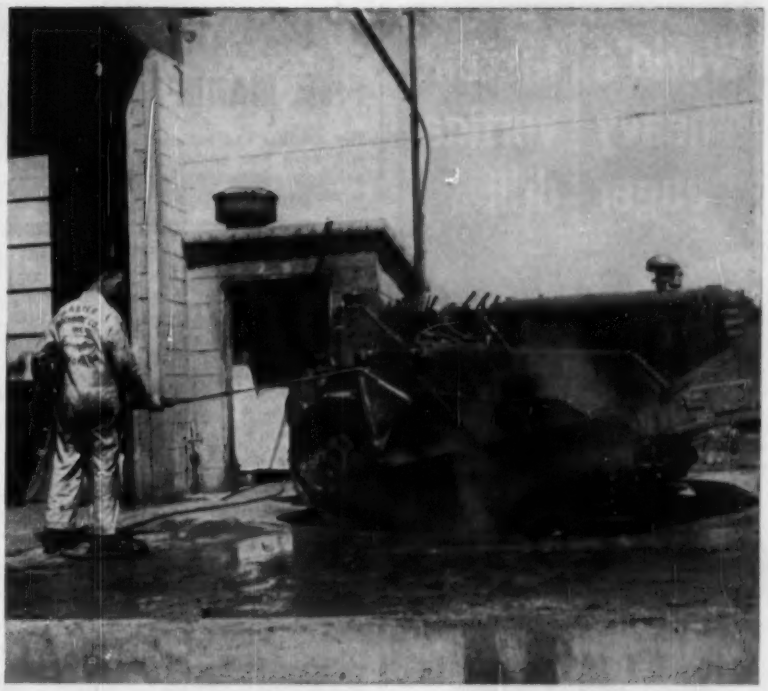
## EQUIPMENT NEWS . . .

Continued from page 166

in. doorway. Capacity is said to be more than 200,000 Btu's.—**Lennox Furnace Co., 1701 E. Euclid Ave., Des Mo!nes 13, Iowa.**

**FRAMELESS DUMP TRAILER**—"Dump body on wheels" is a good description of the Anthony trailer, which eliminates the conventional trailer frame to save weight and increase payloads. A single hydraulic telescopic cylinder mounted on the tractor fifth-wheel coupling lifts the trailer. When it is being raised or lowered, the trailer body pivots around the rear wheels and is supported by tubular stabilizer arms connected to the hoist base. Since the hoist is located over the tractor wheels, good traction is provided when spreading. — **Anthony Co., Streator, Ill.**

**CORRUGATED CUT-OFF WHEEL**—Features of both a continuous rim wheel and a toothed saw are combined in a new cut-off wheel that has its diamond section corrugated. According to the manufacturers, this increases the number of contact points, provides a smoother flow of coolant, and facilitates the removal of sludge. — **Corrugated Diamond Saw Co., 201 Moonachie Rd., Moonachie, N. J.**

In 60 minutes or less, MALSBARY 250 steam cleaner completely removes mud, dirt-impregnated grease and sticky tars from this Caterpillar D4, in for overhaul.

# Does Steam Cleaning Pay?

## Here's what users of Malsbary HPC Cleaners report:

**Doubles track roller life**—Greasy, abrasive ore dust and caked mud wore out track rollers in 1200 hours on the Mesabi Range. Then the maintenance superintendent began steam cleaning every 24 hours, just before greasing, reports: "We now are getting 2400 hours or more on rollers."

**Repaints without hand cleaning**—Cleaning asphalt, road oil and briquet binder from 40 tank trailers was strictly hand work until a MALSBARY HPC cleaner took on the job. It quickly softens and blasts away these sticky materials, leaves an excellent surface for repainting.

To handle such tough cleaning jobs requires lots of water or steam plus real impact. You get both in MALSBARY HPC cleaners.

**HPC means high pressure combination**—MALSBARY HPC cleaners use pumps for pressure instead of steam. You have choice of cleaning with cold water, hot solution (steam), or hot rinse—combined with pressures to 400 p.s.i. These pressures literally explode water or steam (to 325° F.) from the cleaning nozzle, blast away stubborn asphalts and caked dirt other cleaners can't touch. MALSBARY high impact and volume (360 to 2100 g.p.h., depending on cleaner size) results in such average cleaning times as—

| | |
|---|---|
| D7, D8 tractors | 1½ - 2 hrs. |
| TD9 Dozershovel | 2 hrs. |
| Motor grader | 3½ hrs. |
| 1½-yd. shovel | 3-4 hrs. |
| Payloader | 45 mins. |

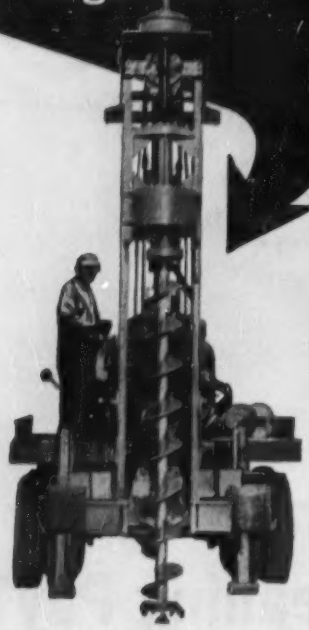
In addition, MALSBARY HPC cleaners supply wet steam for cleaning and degassing tanks and hot water for concrete mixing in zero weather.

**Why settle for a halfway cleaner** when a MALSBARY can handle all your cleaning needs? Try it. Ask your MALSBARY dealer to demonstrate on your job now... or write today for Catalog 150-R and "Why and How of Steam Cleaning" folder. 55

MALSBARY MANUFACTURING CO.

Room C, 845 92nd Avenue, Oakland 3, Calif.

World's heavy auger | fastest, vertical drill



**NEW HEAVY-DUTY McCARTHY drills 8-inch holes 100 feet deep in sandrock in 40 minutes ***

*Ohio River Colliery Co., Cheshire, Ohio

This new heavy-duty drill, Model 106-24, is used for blast hole drilling, general exploration, foundation drilling, dewatering operations, deep post holes, etc. Has high-speed power take-off for small diameter augers, and low-speed power take-off (3 to 1 reduction) for large diameter augers. Hydraulically operated throttle valve.

| AUGER DIAMETER | | | DEPTH OF BORE |
|---|---|---|---|
| 20 INCHES | | | 30 FEET |
| 16 | " | | 40-60 " |
| 12 | " | | 60-80 " |
| 8 | " | and under | 100 " |

8" and 9" diameter augers bore through shale and sandrock to produce larger diameter holes for new type explosives. Larger diameter augers bore through shale and hardpan formations. The choice of contractors where the going is tough.

For complete information contact The Salem Tool Co.
*Ask for Bulletin M-100*

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# *New* PUBLICATIONS From MANUFACTURERS

**The catalogs and bulletins reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.**

**GENERATING PLANTS**—Information covering engine details and specifications for diesel generating plants are incorporated in a new bulletin. A section is devoted to helping select the proper sizes for particular jobs.—**Universal Motor Co, Oshkosh, Wis.**

**HD-11G STORY**—Engineering, design and specification figures of the newest Allis-Chalmers' tractor shovel are described in an illustrated 8-p catalog now available from Construction Machinery Div., Tractor Group, **Allis-Chalmers Manufacturing Co., Milwaukee, Wis.**

**TRUCK EQUIPMENT**—A 4-p catalog gives information on the complete line of dump bodies, hydraulic hoists, trailer dumps, hydraulic Load-N-Gates and special truck equipment. The catalog lists models, capacities and recommended applications.—**Hercules Steel Products Co., Div. of Hercules Galion Products, Inc., Galion, Ohio.**

**GUNITE GUIDEBOOK**—Practically every type of work a Gunite operator would ever encounter is covered by Brochure G-55, a 40-p booklet giving data and illustrations on typical Gunite jobs. It also gives general information on characteristics, recommended practices, and general specifications.—**Gunite Contractors Association, 714 W. Olympic Blvd., Los Angeles 15, Calif.**

**TRUCK-MOUNTED CRANE**—Bulletin H-5-1 describes the new all-hydraulic, truck-mounted H-5 Hydrocrane. The bulletin is supplemented by a 4-p specification list and is contained in a handy literature folder. The H-5, as a lifting crane has a capacity of 9 tons; as clamshell excavator it carries a ½-yd bucket. It can be mounted on a conventional motor truck.—**Bucyrus-Erie Corp, South Milwaukee, Wis.**

**ALUMINUM CONSTRUCTION**—With the increasing use of aluminum as a building material, a booklet called "Alcoa Architectural Aluminum: Care During Construction" may prove of value. It describes the care of aluminum during storage, handling, installation and erection, and discusses finishes and protective coatings. The same company also has a booklet describing aluminum cleaning and maintenance.—**Aluminum Co. of America, 768 Alcoa Bldg., Pittsburgh 19, Pa.**

POUR CONCRETE at LOWER COST BUY EFCO STEEL FORMS

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Lifetime steel faces never need replacing
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Save time, material, money
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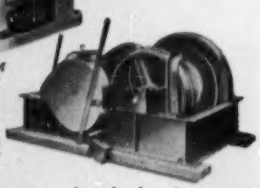
*"Superior" Electric*
**Carpullers**

CAPSTAN TYPE, DRUM TYPE AND SPECIAL TYPES



Model SC Superior Capstan Carpuller

Model EP Drum Type Carpuller

One man can move hundreds of tons of rolling load with practically no effort. Economical, efficient, Carpullers are available for your specialized requirements.

*Write for bulletins and catalogs!*

**Designed and Manufactured by**

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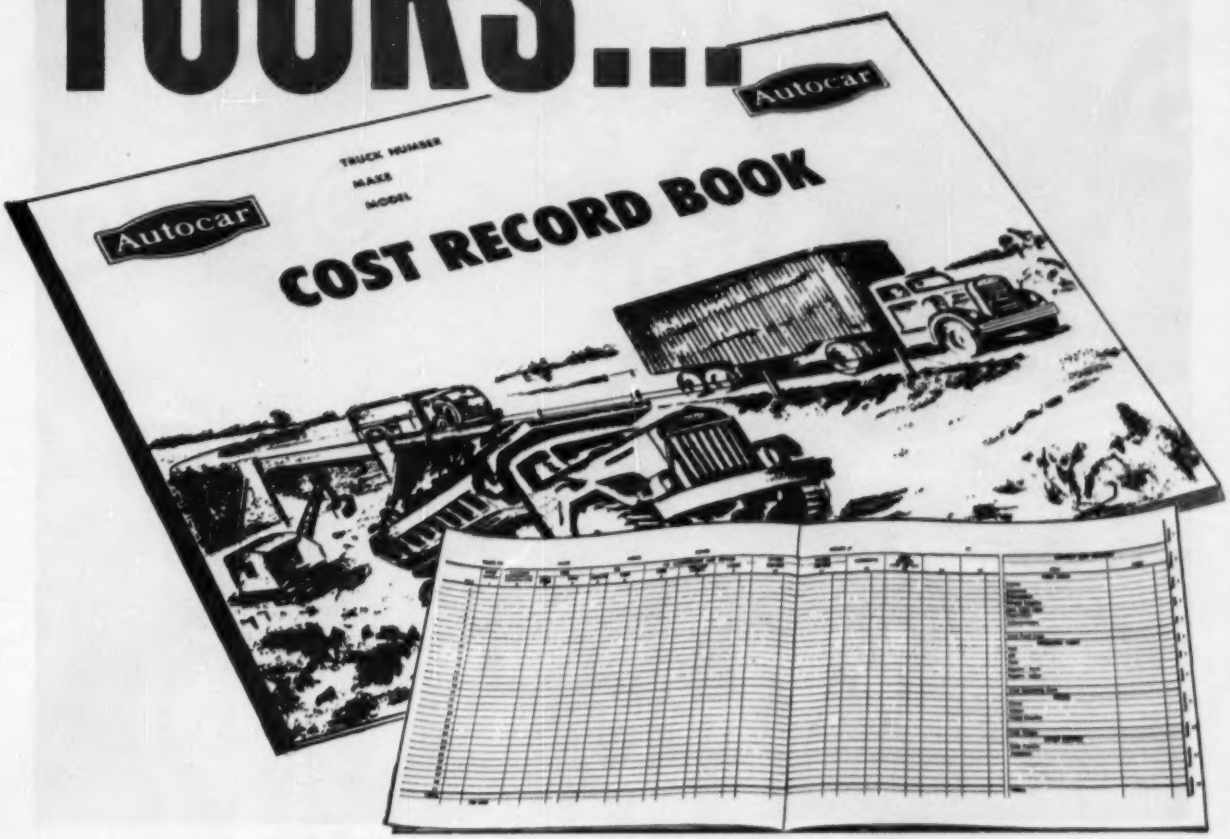
**New York Office, 7 Dey Street, New York 7, N. Y.**

# YOURS....




# For a Great New Year of AUTOCAR Savings

**ONCE AGAIN,** Autocar offers you its proved-efficient "Autocar Cost Record Book" new and revised for its 34th printing.

Start the year with this comprehensive yet amazingly simple system to record total costs of each heavy-duty truck in your fleet.

As usual, we'll be glad to provide you with a sample "Autocar Cost Record Book" at no cost.

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## AUTOCAR TRUCKS

AUTOCAR DIVISION, THE WHITE MOTOR COMPANY
EXTON, PA.

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THE WHITE MOTOR COMPANY
EXTON, PA.

Please send me a free copy of the "Autocar Cost Record Book"

Name_____

Title_____

Firm_____

Address_____

City_____ Zone____ State_____

No. Trucks in Fleet_____

*Architect:* Port of New York Authority; *General Contractor:* S. S. Silberblatt

# Bolted Joints Used in Steel Frame for New Hangar at Idlewild

These trusses are part of the steel framework for the enormous new Hangar 8 at New York International Airport, Idlewild. The hangar, about 440 ft, in length was constructed by The Port of New York Authority to house airplanes of the United Airlines fleet.

The structure has a 99-ft-wide service core along its entire length. Roof trusses spanning this core are cantilevered 133 ft out on either side, forming two bays measuring 440 x 133 ft. Because of the ease of access desired, exterior structure supports were prohibited. The steel framework for the hangar was bolted, Bethlehem High-Strength Bolts being used for all of the main connections.

Bethlehem High-Strength Bolts are ideal for joining structural members because they retain their full clamping force, thus providing permanently tight joints. They can be installed quickly, with minimum noise. And being placed cold, they do not present a fire hazard.

Bethlehem High-Strength Bolts are used with two hardened washers, one under the head, the other under the nut. A calibrated pneumatic impact wrench tightens the nut on the bolt to predetermined tension. This results in tremendous clamping pressure.

Bethlehem High-Strength Bolts are made from carbon steel in a wide range of lengths and diameters. They are heat-treated by quenching and tempering. They meet every requirement of ASTM Specification A-325.

If you have any questions about the use of Bethlehem High-Strength Bolts, you'll find the nearest Bethlehem sales office at your service. Why not put in a call for them now? Or, if more convenient, write direct to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
*Export Distributor:* Bethlehem Steel Export Corporation

**BETHLEHEM STEEL**

BETHLEHEM STEEL

## Stay one LEAP ahead

**The Construction Market Letter for Contractors Can help you**

- Keep a full job schedule
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- Get early warning of shortages
- Watch how prices are increasing
- Study how bids are running
- Watch how much wage rates and labor benefits are rising in new contracts
- See what competition is doing
- Watch the new work that is moving into the engineers' and architects' offices in preparation for future bids

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**For your sample copies of CONSTRUCTION DAILY and information on how this construction market letter can help your business, write to**

**Circulation Manager,**
**CONSTRUCTION DAILY,**
**330 W 42 St, New York 36, N. Y.**


**AIRPORT PROBLEMS**—Jet aircraft development has made necessary new techniques in airfield construction. One problem, the sealing of sawed and formed joints in pavement, is discussed in a new 6-p bulletin that deals with the product characteristics and development of Presstite No. 99 cold-applied paving joint sealer. It is said to be blast- and heat-resistant when subjected to the solvent action of jet fuels. **—Presstite Engineering Co., 3798 Chouteau Ave., St. Louis 10, Mo.**

**WELDING INSTRUCTION**—A series of practical exercises and instructions for developing and improving the technique of arc-welding operators is offered in a 200-p book called "Lessons in Arc Welding." Chapters include starting and manipulating the arc, welding common joints with bare electrodes, welding light gage sheets with coated electrodes, general welding with coated electrodes, and other special practices. The illustrated book sells for $1.**—Hobart Trade School, Inc., Hobart Square, Troy, Ohio.**

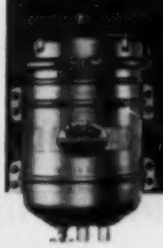
**STEEL SHEETING**—A 4-p technical bulletin describes the properties of American Steel Deck, lightweight, fire resistant ribbed steel sections adaptable for roofs, sidewall, subflooring, or partitions. Information includes erection details, welding specifications and a description of types available.**—American Steel Band Co., P. O. Box 565, Pittsburgh 30, Pa.**

**MOTO-BUG STORY**—By providing three easily interchangeable attachments—a hopper, platform and forklift—the MOTO-Bug has been converted from a power-wheelbarrow into an all-round materials-handling device. Both the three-wheel model R-15 and the four-wheel R-15 are described in a new 8-p booklet. **—Kwik-Mix Co., Port Washington, Wis.**

**KOMPACTOR**—The K-45 Kompactor, with four roller wheels faced with staggered rows of heavy steel pads forming the compacting surfaces, is described in an 8-p bulletin. Information includes specification charts, illustrations and on-the-job reports from contractors.**—Buffalo-Springfield Roller Co., Springfield, Ohio.**

**PLASTIC SEWER LINING**—A new illustrated 8-p brochure describes T-Lock AmerPlate, the continuous plastic sewer lining of high polymer vinyl resin sheet that is impervious to hydrogen sulphide and other sewer gases. Information includes its composition, physical and chemical properties, and the method of incorporating the lining in precast and cast-in-place concrete sewer pipe and structures.**—Amercoat Corp., 4809 Firestone Blvd., South Gate, Calif.**


**NEW LUBER-FINER INDUSTRIAL MODELS ANNOUNCED**



**Luber-finer**

**MODELS 272-C & 363-C FOR MOBILE STATIONARY & MARINE ENGINES**

**With up to 3 & 4 Gal. Crankcase Capacities**

**NOTE:** All Luber-finer Models may be used on engines larger than recommended; however, the Pack life will be proportionately shorter.

**CHECK ALL THESE EXCLUSIVE LUBER-FINER FEATURES**

- ***SINGLE BOLT CLOSURE*** — Ingeniously designed Clamping Ring utilizes Single Bolt Closure for quick, easy Pack Replacement.
- ***POSITIVE SEALING GASKET*** — Long-lasting "O" ring type gasket assures leak-proof lid closure at all operating pressures.
- ***POSITIVE PACK SEAL*** — An outstanding feature that eliminates the possibility of oil ever by-passing the Luber-finer pack.
- ***DUAL SAFETY VALVES*** — Prevents oil drain-back, assuring exact crankcase oil level reading at all times, stops oil from circulating through unit if lines are reversed or if the Luber-finer Unit is otherwise improperly installed.

***Luber-finer Units are Standard and Optional Equipment on America's Leading Diesel Trucks, Tractors and Stationary Engines***

**AND DON'T FORGET!** For Luber-finer's Engineered Protection — Be Sure There is a Genuine **LUBER-FINER PACK INSIDE!**

**Only a Luber-finer Unit plus a Genuine Luber-finer Pack can give you the Exclusive Patented Filtering Process that has made Luber-finer the Standard of the Industry since 1936!**

For Complete Information Write Dept.

**LUBER-FINER, INC.**
2514 S. Grand Ave., Los Angeles 7

# Will this blot spread... or shrink?

NOTHING STRIKES so brutally at human lives as a slum.

Yet of America's many millions of homes, the blot that is a slum covers more than 1 out of every 10... and nearly one-half of all our homes are urgently in need of repair and basic improvements.

Will the blot go on spreading? Or will a concerted, nationwide attack on the causes of slums shrink it, year by year, until it is wiped out? Today, this is a challenge to every American... a challenge that *must* be met.

### Your community... your problem!

A slum reaches across blocks, across miles, to sit on your doorstep and demand a price.

You pay it in the threat of crime and juvenile delinquency to your family. You pay the price in higher personal property taxes to fight the disease and crime and poverty that are slum-bred. You pay personally when the value of your home sinks as community deterioration takes another step closer.

Your *firm* pays when the community where you do business goes downhill. Slums automatically mean lower purchasing power and less effective labor.

### Good citizenship is good business

It's good citizenship and good business both for your firm to join efforts to check housing decay... to stop slums before they start. In fact, it's the *responsibility* of every business, as it is of every other good citizen, to support community improvement efforts.

Some slums are beyond repair. They should be torn down and a fresh start made. Others can be remodeled, made to conform to better living standards. So it is up to you to get behind every sound program which seeks to provide adequate housing for all our people.

Adding your support to the efforts of the millions already attacking the problem, your firm can help stop slums cold and put America's housing standards at a new height.

### How to get into action

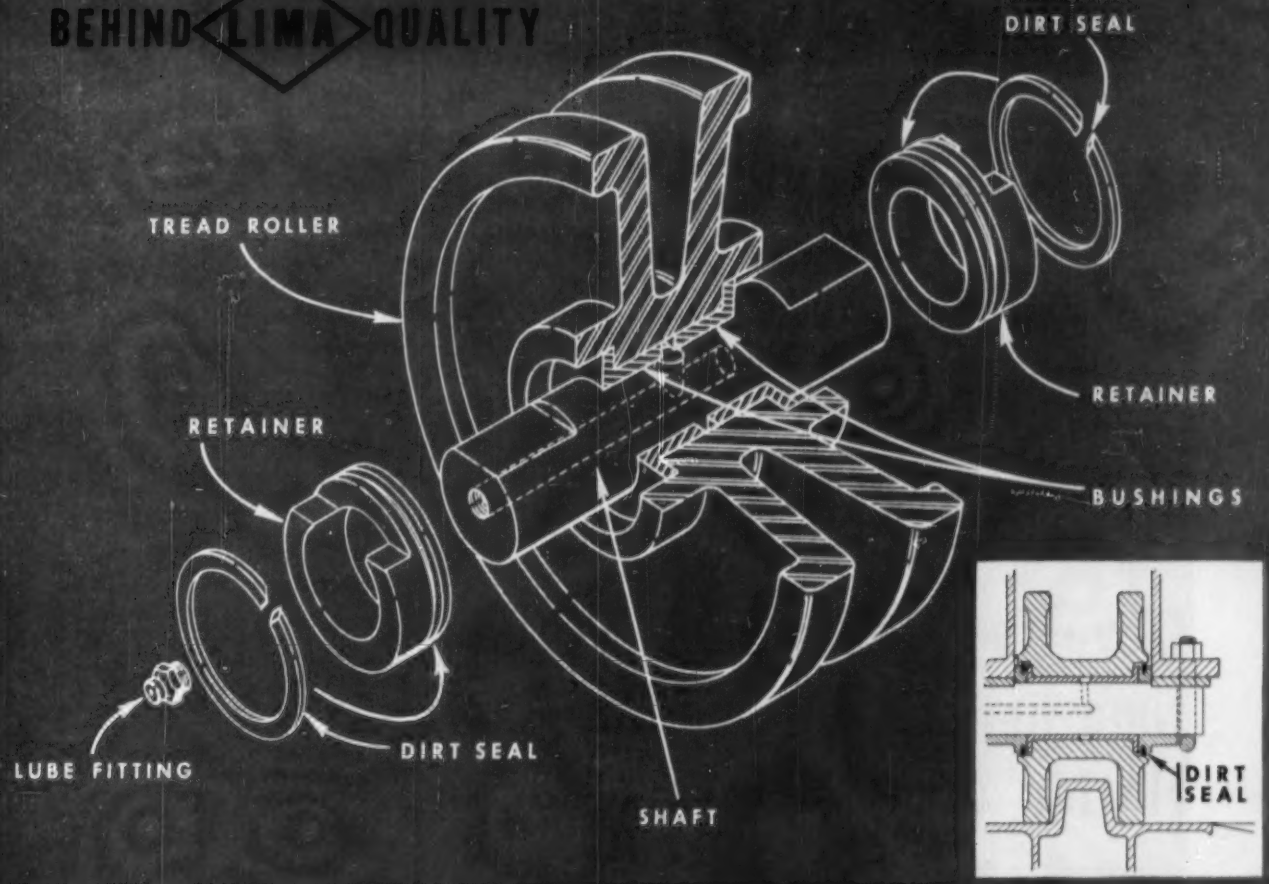
A group of Americans from every walk of life has formed a new, non-profit organization to help combat home and community deterioration — The American Council To Improve Our Neighborhoods... A.C.T.I.O.N.

**Send for a free copy of "ACTION."** It explains what A.C.T.I.O.N. is and proposes to do. It also lists booklets, research reports, check-lists, and other material which can help you protect the housing health of your community. Address P. O. Box 500, Radio City Station, New York 20, N. Y.

**ACTION**

**American Council To Improve Our Neighborhoods**

BEHIND LIMA QUALITY




# LIMA dirt seals cut down-time and maintenance costs

Effective piston-ring-type dirt seals in the tread rollers are another quality "extra" you get when you use a LIMA. Abrasive material which wears out the bushings and shafts of ordinary machines is excluded. LIMA seals the lubricant in and dirt out to reduce friction and prolong the life of bushing, roller and shaft.

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston-ring-type dirt seal rings and retainers.
2. Moving parts are flame or induction hardened for longer life.
3. Main machinery is placed well back of the center of rotation.
4. Anti-friction bearings at all important bearing points.
5. Big capacity drums and sheaves.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Torque converter (optional).
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts.

The features listed above contribute to LIMA'S greater output with less down time and lower maintenance costs. Users agree! It costs less to own a LIMA!

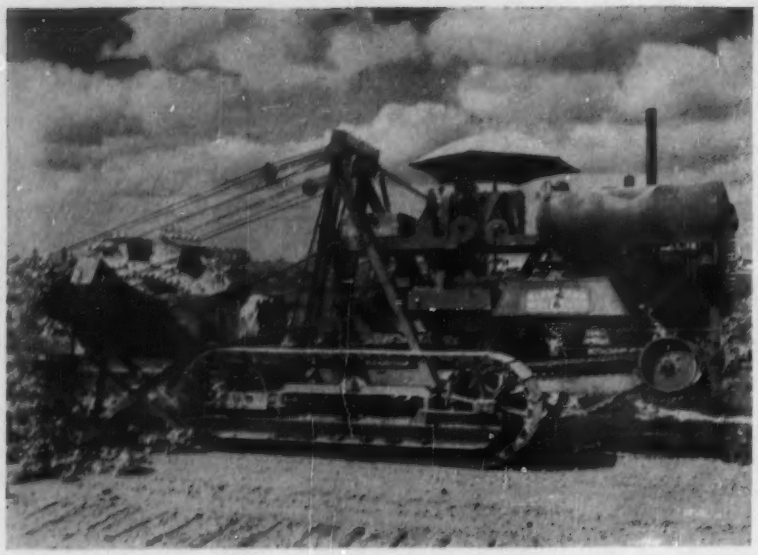
This LIMA demonstrates the importance of LIMA'S dirt seals and grease retainers.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

**LIMA** SHOVELS · CRANES · DRAGLINES · PULLSHOVELS

**BALDWIN-LIMA-HAMILTON**

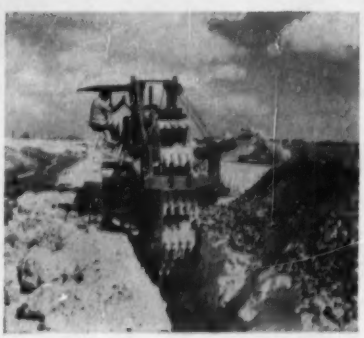
*Construction Equipment Division · LIMA · OHIO · U. S. A.*



# Cleveland "140" *halves* 90-day time limit...digs 44,500 feet Florida coral rock in 45 days

Under contract to dig over 8 miles of water line trenches within 90 days, C.B.S. Excavators of Miami finished the job in just half that time using a fast-moving Cleveland "140" Trencher.

The "140" cut trench through solid coral rock for over 40,000 feet of lines in Miami's Westview Homes Subdivision and for the mile-long main connecting the system to the water plant. Trench for the 6-, 8-, 10- and 12-inch pipe was 20 inches wide and 42 inches deep. In addition to the extensive coral rock, the trenching operation was further complicated by seepage of water into the partially-dug trench in some areas of the subdivision.



"No other machine can match it," owner P. F. Chambers says of his Cleveland "140". "For its size this machine can do more trenching than any other. We use the same machine for digging utilities lines and house footings. It really does a fine job of cutting to grade."

**Your local distributor will show you how Clevelands do more—for less**

**THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave., Cleveland 17, Ohio**

**CLEVELAND**


## IT'S YOUR BUSINESS . . .

**Continued from page 30**

Other cement makers are falling in behind the lead of Universal Atlas. Both the steel and cement companies argue that they need the price increases to pay for needed expansion and increased production costs.

### Equipment Prices Up 5.3% in Three Months

Prices of construction equipment jumped 5.3% in three months, August to October, according to the Bureau of Labor Statistics index of manufacturers' prices. This brought average prices to 8.3% above a year ago, by far the sharpest 12-month rise since 1950 (see chart below).

Price advances during the last 12 months have ranged from a high of 9.3% for power cranes and shovels to 5.9% for machinery for mounting on tractors (see table). Most of this increase came after the hike in steel prices last July. If, as expected, steel prices rise again within the next six months, there's a chance that equipment prices also will increase again.

### Contractor Prices Rising

All the evidence shows contractors are raising their prices. The downtrend in bid prices on federal-aid highway jobs has been reversed this year. Third quarter bids rose to the highest since 1953, according to the Bureau of Public Roads Composite Mile Price Index. A similar trend shows up on heavy engineering construction bids in

*(Continued on page 179)*

### Construction Equipment Price Indexes—1947-49=100

Bureau of Labor Statistics

| Type of equipment | Oct. 1954 | Sept. 1955 | Oct. 1955 | Per cent change 10/54-10/55 | Per cent change 9/55-10/55 |
|---|---|---|---|---|---|
| All types | 131.6 | 140.5 | 141.9 | +7.8 | +1.0 |
| Power cranes, shovels | 130.7 | 142.6 | 142.8 | +9.3 | +0.1 |
| Tractors | 140.6 | 148.8 | 151.2 | +7.5 | +1.6 |
| Scrapers and graders | 129.4 | 138.1 | 139.3 | +7.7 | +0.9 |
| Mixers and pavers | 121.6 | 129.1 | 130.2 | +7.1 | +0.9 |
| Machinery, tractor mounted | 133.9 | 139.2 | 141.8 | +5.9 | +1.9 |
| Specialized constr. machinery | 122.8 | 129.6 | 131.4 | +7.0 | +1.4 |
| Portable air compressors | 125.6 | 133.6 | 133.6 | +6.4 | 0.0 |
| Air tools, hand held | 125.0 | 132.1 | 135.7 | +8.6 | +2.7 |

# How AMSCO® helps you HARDFACE MORE EFFECTIVELY

The complete line of 15 Amsco hardfacing rods represents a selection of the toughest, hardest alloys available. Among the metals used for alloying are these highly wear-resistant elements—manganese . . . chromium . . . nickel . . . cobalt . . . tungsten . . . molybdenum. Each has particular resistance to certain types of wear—including impact, abrasion, heat, corrosion.

Your Amsco distributor has many helpful methods for selecting the proper hardfacing rod to most effectively combat types of wear you contact daily. *Make him your hardfacing headquarters.*

**AMSCO CATALOG MAKES ROD SELECTION EASY**

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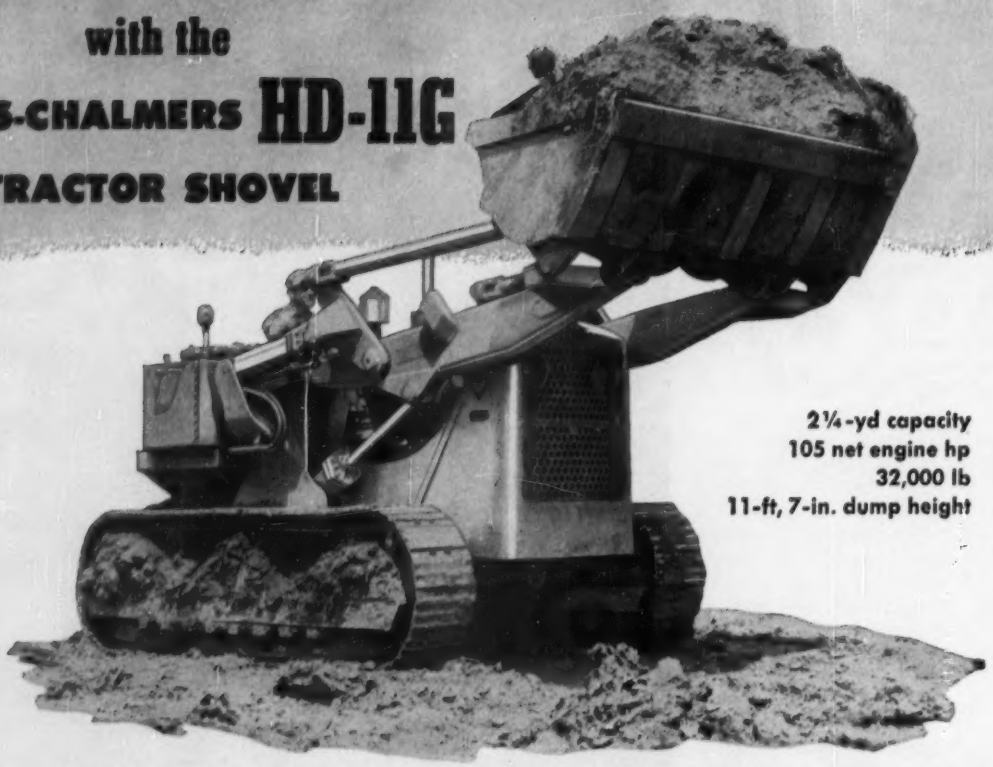

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**105 net engine hp**
**32,000 lb**
**11-ft, 7-in. dump height**

**NEW POWER** is provided by the modern, 105-hp Allis-Chalmers diesel. Tornado Turbulence and "follow-through" combustion mean cleaner burning and more power from fuel, as well as smoother engine performance and extra long engine life. Added power pays off in extra crowding and digging ability, fast work cycles.

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**NEW-TYPE HYDRAULIC SYSTEM** is simpler, safer, easier to maintain. Tank has fewer external fittings. Magnetic filters and suction-line screens protect entire system. Hydraulic pump offers fast action, long life.

**NEW OPERATOR CONVENIENCE.** The HD-11G features easily controlled, accurate bucket action; reduced lever pull with new-type clutch; full vision; roomy platform; foam rubber seat; 60-gal fuel tank.

**NEW DEPENDABILITY AND SERVICING EASE** result from such features as heavy-duty truck wheels and idlers; new, long-life track; new-type, long-lasting, ceramic master clutch lining; unit construction's quick disassembly and assembly of major parts; 1,000-hour lubrication intervals for roller bearing truck wheels, support rollers, idlers.

***stop in soon and see the production-boosting HD-11G***

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

Stop in soon and see the production-boosting HD-11G at your Allis-Chalmers dealer's.

**ALLIS-CHALMERS**

**IT'S YOUR BUSINESS . . .**

**Continued from page 176**

the West. The Bureau of Reclamation's Denver Office reports its bid price index rose nearly 4% between January and July 1955, compared with a 5.3% drop during 1954.

Building contractors, too, are increasing their selling prices. The average of four major contractor building price indexes rose 3.4% during the first 10 months of this year (these contractors are: Austin, Fuller, Fruin-Colnon, and Turner). This is more than three times the 1.1% average increase during 1954.

Even though contractors are charging more for construction this year, the uptrend in prices still lags well behind the rise in costs (see chart). For instance, the four-contractor building cost index average is up 28% above 1949, whereas the CM&E Building Cost Index, which measures the trend in materials and labor prices, has increased 36%.

A still greater gap is between prices bid on highway and engineering construction, up 6-7% over 1949, and CM&E's Construction Cost Index which has climbed 41% since 1949.

Good management, more and better equipment, high volume at low profit margins all help explain how contractors have held their prices to a fraction of the steady climb in labor and materials costs. In a sense, construction prices have actually come down relative to costs since 1949. Today's construction buyer is, in most instances, getting a bargain thanks to the contractors ability to cut his costs.

Scientists, too—by the modern world we live in. Don't let your youngsters miss future career opportunities by hasty choices. For instance, see that they include enough math and science courses in high school so careers in engineering, science, chemistry and other professions will remain open to them.

**Write for the free folder "After High School What?" c/o Box 40, Mid-Town Station, New York 18, N.Y.**

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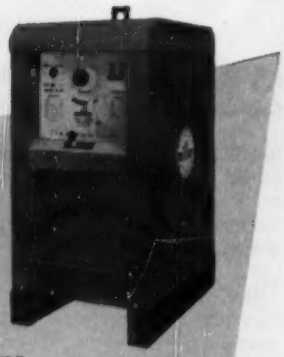

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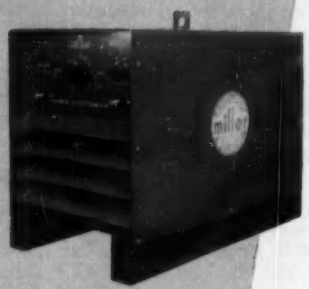

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# Advertisers in this Issue

Number of copies of this issue printed 42,587


A

Air Placement Equipment Co. ..... 94
Allis-Chalmers
(Buda Div.) ..... 104
(Construction Machy Div.) .....24, 25, 178
American Bitumuls & Asphalt Co..... 182
American Hoist & Derrick Co. .....124, 125
American Manganese Steel Div.,
American Brake Shoe Co. .....144, 177
Atlas Copco .....100, 101
Atlas Powder Co. ..... 183
Austin-Western Co. ..... 90
Avco Mfg. Corp.
(Lycoming Div.) ..... 119

B

Baldwin-Lima-Hamilton Corp.
(Construction Equip. Div.) ..... 175
Barber-Greene Co. ..... 26
Barco Mfg. Co. ..... 132
Bay City Shovels, Inc. ..... 116
Bethlehem Steel Co. .....34, 148, 172
Blackhawk Mfg. Co. ..... 154
Bucyrus-Erie Co. ..... 111
Butler Bin Co. ..... 151

C

C & D Manufacturing Co. ..... 102
Caterpillar Tractor Co.....29, 67-74
Chevrolet Div.,
General Motors ..... 38
Chrysler Corp.
(Ind. Eng. Div.) ..... 123
Cities Service Oil Co. ..... 23
Clark Equipment Co.
(Automotive Division) .....2nd cover
(Construction Machy. Div.) ..... 79
Clayton Mfg. Co. ..... 179
Cleveland Trencher Co. ..... 176
Construction Daily..... 173
Construction Machinery Co's ..... 138
Cummins Engine Co. .....82, 83

D

Dewey and Almy Chemical Co.
(Div., W. R. Grace Co.) ..... 158
Dixon Valve & Coupling Co. ..... 150
Dodge Div.,
Chrysler Corp. ..... 93
DuPont de Nemours & Co., Inc., E. I.
(Textile Fibers Dept., Nylon
Tire Cord) .....48, 49

E

Economy Forms Corp. ..... 170
Eimco Corp. ..... 50
Elis Equipment Co., Inc. ..... 160
Euclid Div.,
General Motors .....114, 115

F

Firestone Tire & Rubber Co. ..... 136
Flexible Steel Lacing Co. ..... 166
Ford Motor Co. ..... 142
Foster Co., L. B. ..... 4
Fuller Manufacturing Co.
(Transmission Div.) ..... 131

G

Galion Iron Works & Mfg. Co., The....8, 9
Garrett Corp., The
(AiResearch Industrial Div.) ..... 155
Gates & Sons, Inc. ..... 165
General Electric Co.
(Electronics Div.) ..... 147

(Continued on page 182)

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# Advertisers Index

(Continued from page 181)


Goodrich Co., The B. F.
(Tire & Equipment Div.) ..... 1
Griffin Wellpoint Corp. ..... 157

H

Hawkinson Co., Paul E. ..... 179
Hercules Motors Corp. ..... 10
Hetherington & Berner, Inc. ..... 149
Hobbs Corp., John W. ..... 166
Homelite Corp. ..... 40
Hough Co., Frank G. ..... 36, 37
Hyster Co. ..... 20

I

Ingersoll-Rand Co. ..... 12
International Harvester Co., Inc.
(Industrial Power Division) ..... 13, 14, 15
(International-Drott) ..... 16
(Motor Truck Div.) ..... 164
Iowa Mfg. Co. ..... 17
Irvington Form & Tank Corp. ..... 23

J

Johns-Manville ..... 162
Johnson Co., C. S. ..... 99

K

Koehring Co. ..... 99
Kwik-Mix Co. ..... 98, 99

L

Lehigh Portland Cement Co. ..... 43
LeRoi Div.,
(Westinghouse Air Brake Co.) ..... 32
LeTourneau-
WESTINGHOUSE Co. ..... 47, 139, 141, 143
Lone Star Cement Corp. ..... 5
Luber-Finer, Inc. ..... 173
Lubriplate Div.,
Fiske Brothers Refg. Co. ..... 118

M

Macwhyte Co. ..... 3
Madesco Tackle Block Co. ..... 160
Maisbary Mfg. Co. ..... 169
Manhattan Rubber Division ..... 108
Master Builders Co. ..... 3rd cover
Mayo Tunnel & Mine Equipment ..... 182
Miller Electric Mfg. Co. ..... 150
Miller Trailer Co.
(Miller Research Engrs.) ..... 149
Minneapolis-Moline Co.
(Industrial Div.) ..... 86
Morstrench Corp. ..... 81

N

North America, Indemnity
(Insurance Co. of) ..... 137
Northwest Engineering Co. ..... 7

O

Owen Bucket Co. ..... 106

P

Pacific Car & Foundry Co. ..... 146
Parsons Co. ..... 99
Patent Scaffolding Co., Inc. ..... 156
Phillips Petroleum Co. ..... 78
Plomb Tool Co.
(Proto Tools Div.) ..... 2

R

Raybestos-Manhattan, Inc. ..... 108
Reo Motors, Inc. ..... 88, 89
Rockwell Spring & Axle Co. ..... 44, 45
Roebling's Sons Corp., John A. ..... 120
Rogers Bros. Corp. ..... 181

S

Salem Tool Co., The ..... 170
Sauerman Bros., Inc. ..... 22
Sherman Products, Inc. ..... 96, 97
Sinclair Refining Co. ..... 103
Smith Co., The T. L. ..... 107
Standard Dry Wall Products ..... 185
Standard Oil Co. of (Calif.) ..... 127
Standard Oil Co. of (Indiana) ..... 167
Steody Company ..... 75
Stratex Instrument Co., Inc. ..... 181
Superior Concrete Accessories, Inc. ..... 168
Superior-Lidgerwood-Mundy Corp. ..... 170
Symons Clamp & Mfg. Co. ..... 30

T

Texas Company ..... 18, 19
Thermoid Co. ..... 135
Thew Shovel Co. ..... 11


(Continued on page 185)

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# Advertisers Index

(Continued from page 182)


Timken-Detroit Axle Div.
Rockwell Spring & Axle Co. .....44, 45
Timken Roller Bearing Co. .....4th cover
Twin Disc. Clutch Co. ..... 163

U

Union Wire Rope Corp. .....112, 113
Unit Crane & Shovel Corp. ..... 95
United States Rubber Co. ..... 35
United States Steel Co. ..... 161
Universal Engrg. Corp. ..... 21
Universal Form Clamp Co. ..... 140

V

Visking Corp.
(Plastic Div.) ..... 31

W

Westinghouse Electric Corp. .....33, 159
White Motor Co. (Autocar Div.) ..... 171
Whiteman Mfg. Co. ..... 87
Willys Motors, Inc. ..... 129
Wrought Washer Mfg. Co. ..... 6


## CLASSIFIED ADVERTISING

Frank J. Eberle, Assistant Mgr.


EMPLOYMENT OPPORTUNITIES ..... 184
Special Services ..... 184
Educational ..... 184
Equipment
(Used or Surplus New)
For Rent ..... 184
For Sale ..... 184



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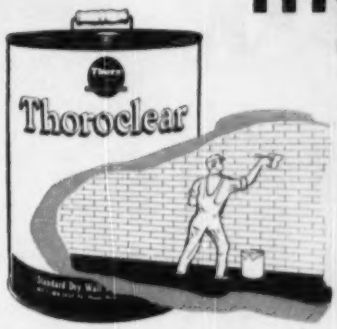


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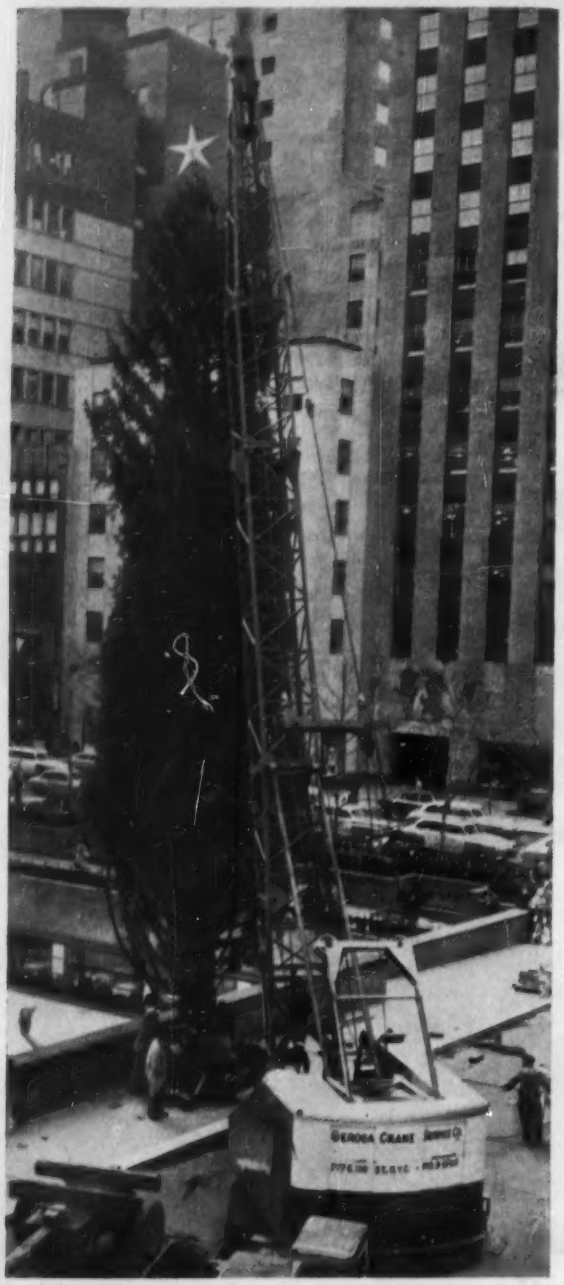
NEW EAGLE, PENNSYLVANIA

# Methods Memo . . .



## A Tree for Christmas . . .

**A Christmas tree may be just a few inches high or as tall as the boom of a crane. Whatever its size, the job of erecting and decorating it is one to warm the heart of a man. This tree in New York City's Rockefeller Center is a 65-ft Norway spruce that weighs 3.5 tons. Grose Crane Service Co., New York, erected the tree, using a P&H crane with an 80-ft boom. Then, Chesbro-Whitman Co., Inc., built a scaffold six stories high around it for decorators to work on. It took a crew of 20 men an entire week to install the 3,900 lights and other decorations. It's a king-size tree, all right, and it stands for the same Christmas spirit as the smaller ones in millions of homes.**

## Welcome, Turnpike

Elyria, the Ohio city that fought construction of the Ohio Turnpike through its city limits for more than a year, now is glad it lost that battle. Elyrians are pretty happy about the new toll highway.

"I have not had one complaint since the turnpike opened," Mayor J. Grant Keys said. "We find it has not damaged the city as those who opposed it feared it would."

The city's change of heart about the turnpike began shortly after it was opened to traffic with the announcement that a $600,000 restaurant would be built in Elyria to serve turnpike travelers. Now most citizens are convinced that prosperity will ride into Elyria on the new toll highway.

## Records Galore

A British and a U.S. firm both claim they have set new world's records for hard rock tunneling. Kaiser-Walsh-Perini & Raymond, a combine of U.S. contractors working on the Eucumbene Tunnel in Australia, reports its crews punched through 461 ft of solid rock in one week to beat their old record of 405 ft (CM&E Oct. p. 114). The tunnel has a diameter of 24 ft and runs through a relatively hard quartzite.

Mitchell Construction Co., Ltd., of London, England, claims a world's record on a job for the North of Scotland Hydro-Electric Board at Breadalbane, Scotland. Mitchell says its crews drilled through 557 ft of Schistose-grit, a hard rock formation, in one week. The tunnel has a bed-width of 8 ft, 6 in. In the seven-day period, crews completed 88 cycles. Average pull was 6 ft, 4 in. per cycle.

## Serious about Safety

Some other contractors might take a page from the book of the Ben Massell Co., Atlanta, Ga. Massell is enforcing a strict accident prevention program that includes these eight ironclad rules:

- All men will wear hard hats at all times.
- All floor openings of every kind will be covered or guarded.
- Stairs must have handrails on both sides.
- All swing staging must be supported by a deadlock winch with a governor, and the roof of the staging must be no more than seven feet from the floor.
- Backrails and toeboards must be installed on all staging.
- All men doing any climbing must wear life belts and tie-off lines.
- All electric power tools must be three-wire with three-wire plugs. No pigtails allowed.
- Each foreman must hold an on-the-job safety meeting at least once a week and turn in a report on the meeting to headquarters at the end of the week.

Massell insists its subcontractors stick by these rules, or else! It has terminated contracts with two subs and fired one superintendent and several employees for safety violations.

## How to Keep Busy

Here's a British contractor with several irons in the fire. W. M. Cederstrand of August Cederstrand Co., Minneapolis, Minn., contractor, tells the story of receiving a cornerstone for a new church that had been shipped from St. David's Church in Scotland. It bore this return address: "E. G. Thomas & Son, Builders, Contractors, Undertakers, and Ecclesiastical Workers."

Quinnesec Falls Dam
Owner: Wisconsin Michigan Power Company
Engineer: Mead & Hunt, Inc., Madison, Wisconsin
Contractor: C. R. Meyer & Sons, Oshkosh, Wisconsin
Pozzolith Concrete batched at job site.

# POZZOLITH

## in concrete for uniform quality...

**POZZOLITH... the key to-**

- lowest possible unit water content*
- close control of entrained air... placing consistency... rate of hardening
- reduced costs

* For a given set of materials and water-cement ratio, unit water content (water required per cubic yard of concrete) is the most important basic factor affecting the quality of concrete. A.C.I., Committee 613, 1944 Report, Page 655. Bureau of Reclamation Concrete Manual, 5th edition, Page 130.

This dam is one of a long list of outstanding structures built since 1932 in which Pozzolith, an admixture for concrete, has enabled engineering to better control concrete quality.

Engineers employ Pozzolith with confidence because:

1. *proved performance*...100 million cubic yards of concrete produced with Pozzolith for all types of jobs.

2. *applied know-how*...over 70 skilled Master Builders' field technical men for product-use consultation.

3. *available everywhere*...1000 ready-mix and job-site plants now producing concrete with Pozzolith.

Ask us to demonstrate the advantages of Pozzolith for your project.

The MASTER BUILDERS Co

Subsidiary of American-Marietta Company

# Whips world's toughest terrain, TIMKEN® bearings take 23-ton load

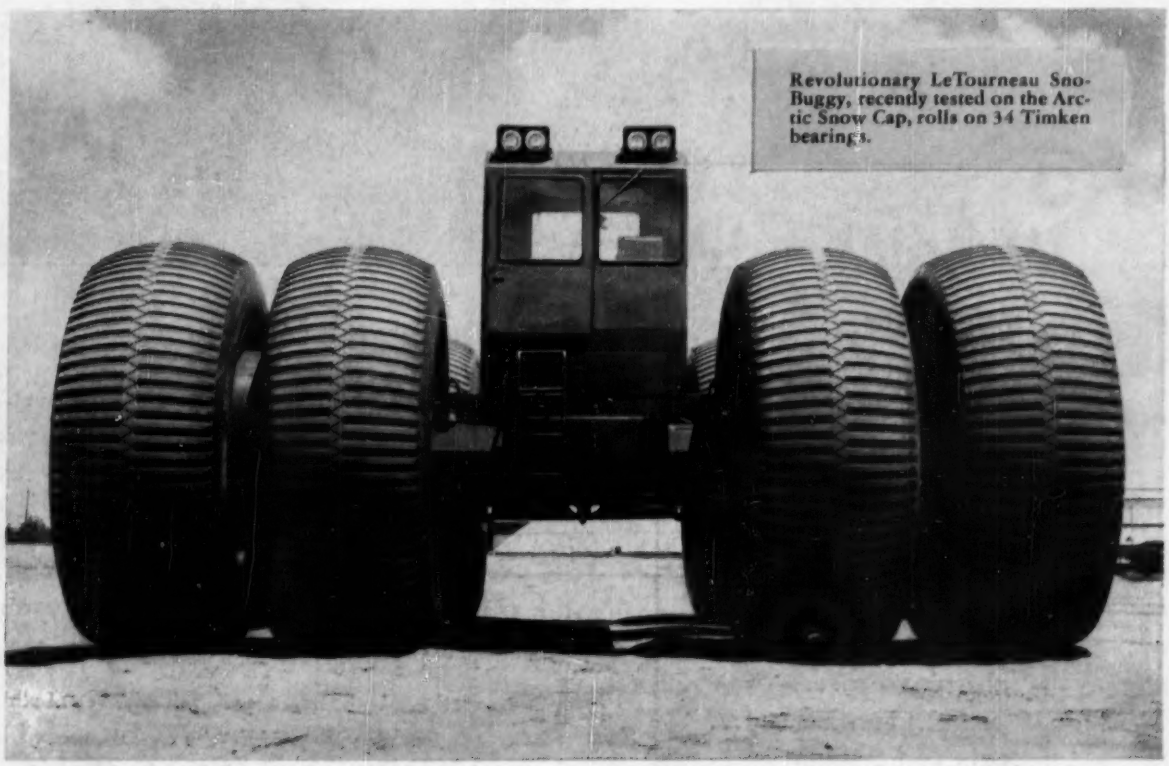
ROLLING on Timken® bearings, this amazing LeTourneau Sno-Buggy, designed and built by R. G. LeTourneau, Inc., Longview, Texas, "floats" over snowfields, swamps and desert sands on the world's largest tires . . . 10′ high and 4′ wide, carrying as little as 5 lbs. pressure. Its individually-powered electric wheels propel it forward or backward at 8 m.p.h. over terrain never traveled before.

Rugged service like this means that its bearings have to take tremendous radial and thrust loads. That's one reason LeTourneau engineers specified Timken tapered roller bearings. Because of their tapered construction, Timken bearings take radial and thrust loads in any combination. They can take sudden shock loads, too, because their rollers and races are case-carburized to give them a hard, wear-resistant surface over a tough, shock-resistant core.

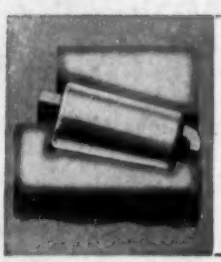
Line contact between rollers and races permits Timken bearings to carry the Sno-Buggy's heavy wheel loads. And the Sno-Buggy's huge dual tire wheels turn easily because Timken bearings are geometrically designed to have true rolling motion and precision manufactured to live up to their design. We even make our own steel to be sure of getting the best. We're the only U. S. bearing manufacturer that does.

Always specify Timken tapered roller bearings when you buy or build machines. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

*This symbol on a product means its bearings are the best.*



Revolutionary LeTourneau Sno-Buggy, recently tested on the Arctic Snow Cap, rolls on 34 Timken bearings.



**GREATER LOAD AREA**

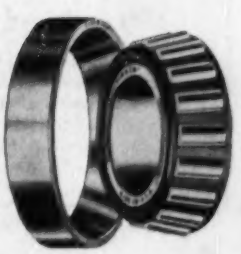
Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis Timken steels.

**TIMKEN**

TRADE-MARK REG. U. S. PAT. OFF.

**TAPERED ROLLER BEARINGS**



NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬮ AND THRUST ⬮ LOADS OR ANY COMBINATION ✳